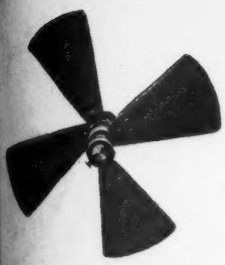
# Pit and Quarry

GRAVEL ▪ STONE

NDLING ▪ CRUSHING ▪ SCREENING ▪ WASHING

The Propeller Keeps the Loader Loading



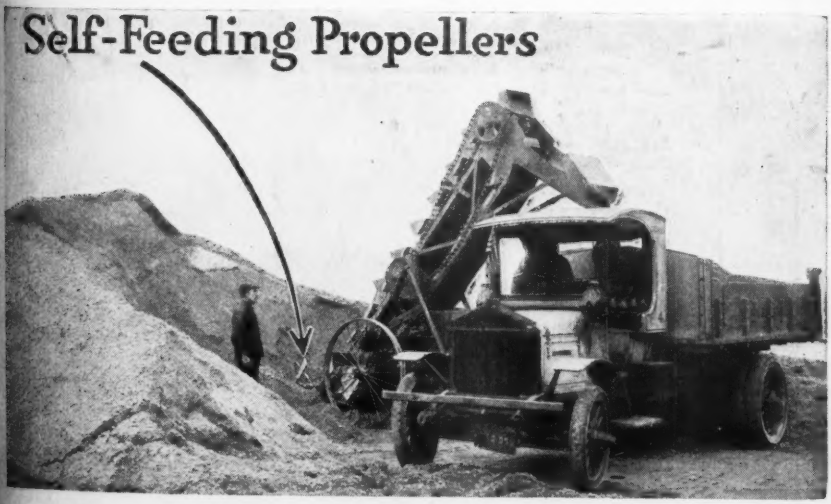
## Haiss "Path Digging" Wagon Loaders

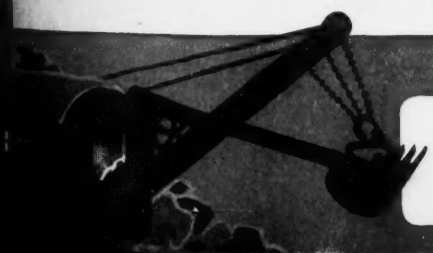
some day will be loading trucks at every profitably managed sand bank, gravel pit and crushed stone storage pile. It is self-propelled, self-feeding, self "crowding" and path digging. Besides, it loads 1 cu. yd. per minute for ½ cent power cost, and it needs no help from shovel labor for filling the buckets or clearing a path for the wheels—only the operator. There is never any argument about Haiss dependability or economy or value. The "Path Digging" loaders do the most work for the least money—established facts. Write for new catalogue No. 1119—free.

## GEO. HAISS MFG. CO.

142 St. and Rider Ave. New York City

## Self-Feeding Propellers






MARCH, 1920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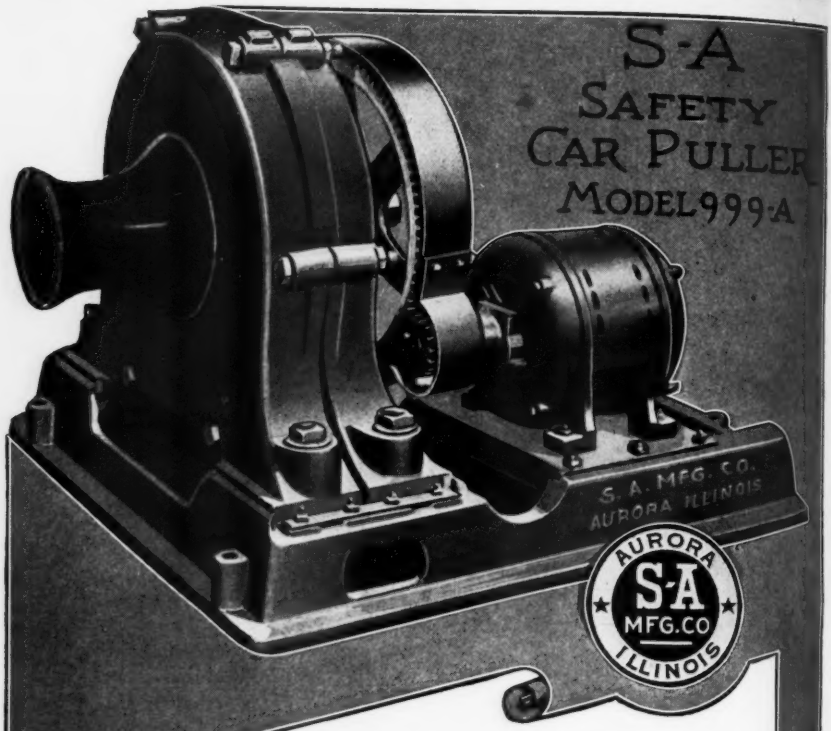



# *Don't Wait for a Switch Engine*

When you want to move freight cars on your track siding, the S-A Car Puller is ready to do the job. One man easily and quickly shifts cars with this sturdy machine.

SPECIFICATIONS

| | |
|---|---|
| Size of base | 4 feet by 4 feet 2 inches |
| Height of case | 3 feet ⅞-inch |
| Size of capstan | 8 inches by 10½ inches |
| Speed of capstan | 48 R. P. M. |
| Pulling speed | 100 feet per minute |
| Capacity | 2,000 pound pull |
| Motor required | 7½ H. P. |

SIMPLE POWERFUL SAFE

*Write for Car Puller Folder*

**Stephens-Adamson Mfg. Co.**
**Aurora, Ill.**

ERIE Shovel owned by White Oak Crushed Stone Co., New Britain, Conn.

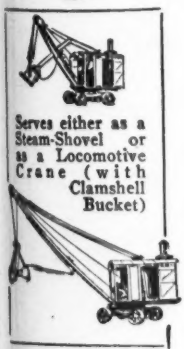
# In this quarry, the ERIE saves $70 a day

"The ERIE Shovel replaces 25 men in this quarry," *says B. J. Bixby Supt., WHITE OAK CRUSHED STONE CO., New Britain, Conn.*, "It saves more than $70 a day, after deducting all shovel expenses, including depreciation and interest.

"We have a hard trap rock in this quarry, and we need the compact and durable build of the ERIE."

The ERIE is the *RELIABLE* steam shovel. It is built with enough strength to work steadily, even when loading hard rock.

We would like to send you a Bulletin showing just what the ERIE Shovel can do. Write for a copy of Bulletin Q. Address:



Serves either as a Steam-Shovel or as a Locomotive Crane (with Clamshell Bucket)

**BALL ENGINE CO., Erie, Pa.**
Builders of ERIE Steam Shovels and Locomotive Cranes.

**ERIE Revolving Shovels** BALL

# They have *drilled* their way to *Success!*

# HARDSOCG WONDER DRILLS

Faster drilling with less power and minimum upkeep are reasons for the increasing popularity of the WONDER DRILL.

A case in point: One of our customers recently advised us that he operated our drill from May 5th to December 22nd, last—a period of more than six months —without the slightest expenditure for upkeep or repairs.

## Observe These Advantages:

The use of live air for operating the drill or cleaning drill hole of cuttings is controlled by one lever handle valve.

When in operation the piston hammer will not strike front end—thus eliminating breakages.

The lowest consumer of air of any drill made doing same amount of work. Fifty feet at 80 pounds pressure operates this drill successfully. Can you operate any other drill as economically?

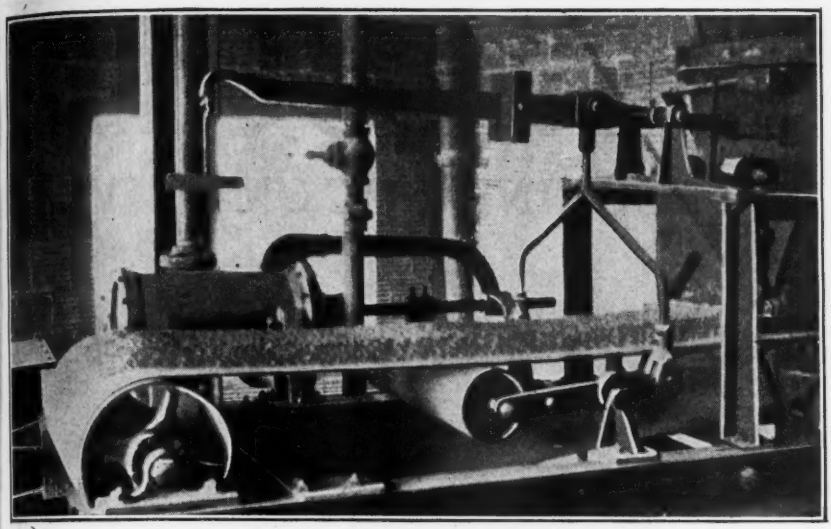
Fewest number of parts, and lowest cost of upkeep.

Skilled labor not necessary with this drill.

***Write for Descriptive Bulletin***

## Hardsocg Wonder Drill Company

**Ottumwa, Iowa**



## Successful Cement Manufacturers Use The SCHAFFER Poidometer

*BECAUSE*

It handles materials AUTOMATICALLY, doing the work of correctly proportioning by weight; adding proper proportions of liquid in wet process; operating with 99.50 per cent accuracy; keeps tab on production and wastage.

This outfit will handle a wide variety of materials, such as ground quick lime, limestone, hydrate lime, ground shales, coal, coke, ores, sawdust, zinc, fire clays, manganese, litharge, white lead, etc.

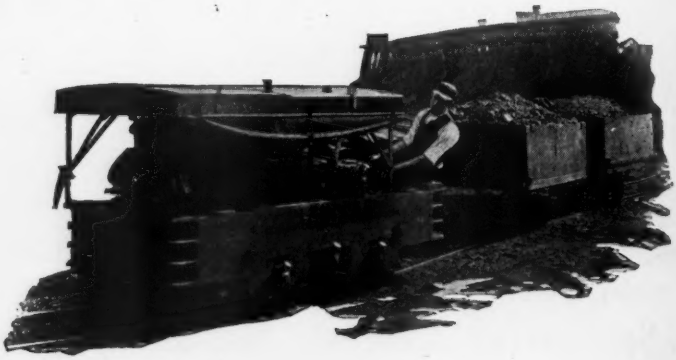
***Can you afford to be without one?***

**The Schaffer Engineering & Equipment Co.**

**Peoples Bank Building** **Pittsburgh, Pa.**

# PLYMOUTH

## GASOLINE LOCOMOTIVES



### *No Matter What the Problem*

No matter what the enterprise or industry, if haulage is a problem, then the Plymouth is the solution.

The Plymouth Gasoline Locomotive is the pioneer in industrial haulage. It has been the color-bearer for a score of years. It is the pacemaker with more speed, more power and more years of service.

Have you a haulage problem? Do you want to do more work for less cost and more profit? Do you want a way out of the lack of men and teams?

Then adopt the Plymouth way—Let the Plymouth take the grief and burden—Investigate now.

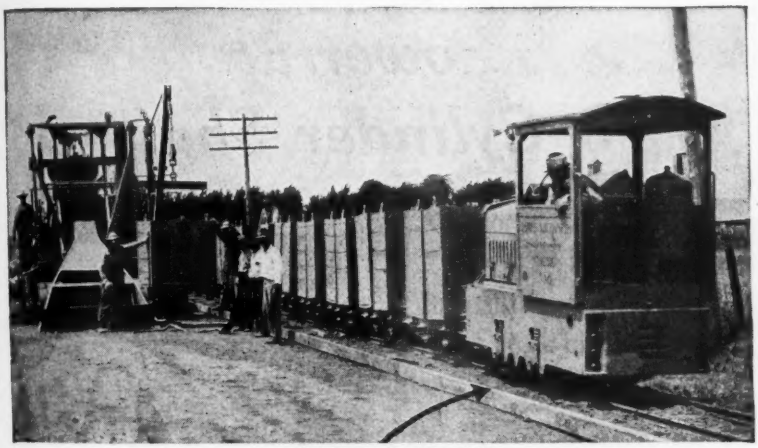
Our Engineers are at your service. Our Bulletins are full of industrial information and haulage solutions. Write for them.

## The Fate-Root-Heath Co.

**206 Riggs Avenue** **Plymouth, Ohio**

# WHITCOMB LOCOMOTIVES

ALL SIZES
FOR ALL CONDITIONS
POSITIVE GEAR AND FRICTION DRIVE
GASOLINE AND STORAGE BATTERY



## SIX TON

**3-Speed Positive Drive**

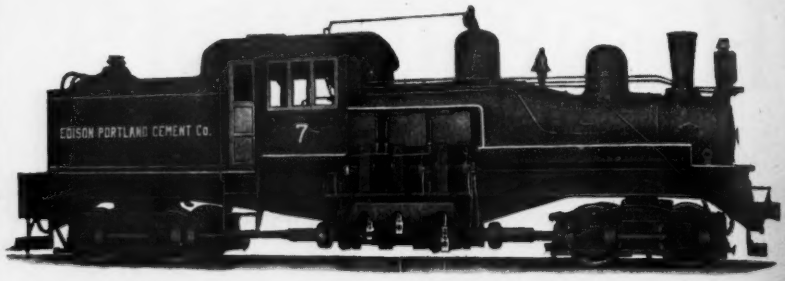
## Road Contractors Special

This Six-Ton Gasoline Locomotive Will High Ball More Material to the Mixer Than Any Other Gasoline Locomotive Built of Its Weight.

Gasoline Locomotives, 2½ to 25 Tons. Storage Battery Locomotives, 2 to 8 Tons on Drivewheels.

## GEO. D. WHITCOMB CO.

ROCHELLE ILLINOIS




60 Ton Shay—Edison Portlant Cement Co.

# *Powerful 3 Cylinder Shay*

All the wheels of a "Shay" are drivers including the tank wheels.

A drive shaft and gearing distributes the power from 3 cylinders to each and every wheel.

Every pound of weight of a Shay is used in making effective the pulling power of these cylinders.

The Shay is the most powerful kind of motive power you can use for quarry work.

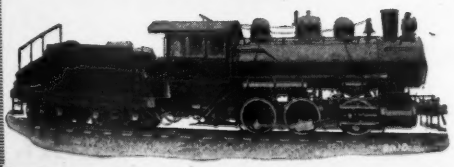
And it is made flexible for easy curving around sharp curves.

**Lima Locomotive Works, Incorporated**
**30 Church St., New York**
**LIMA, OHIO**

Five winters of contracting work without a breakdown—even in the coldest weather.

The record sheets on this VULCAN Locomotive show that it hauled 2,000,000 cubic yards of dirt in two and one-half years, or slightly more than 2,400 cubic yards per day with an average of 32 trains and a total daily run of nearly sixty miles.

*A typical VULCAN record*



**Vulcan Iron Works**

***Locomotive Designers and Builders for 48 Years***

**1754 Main St.**

**Wilkes-Barre, Pa.**

*"Very Satisfactory"*

is what Holbrook & Skinner say of

# *The* BAY CITY LOADER

## For Pit and Quarry Service

This machine is in operation loading gravel at their plant in Lansing, Mich. It is rendering excellent service and Mr. Skinner most willingly said so.

The BAY CITY Loader operates a powerful digging bucket that takes a big load at every bite. Handles a large amount of material at very low cost. Can be used for stripping, grading and loading sand, gravel or clay from bank into cars or wagons. Operating and upkeep costs small.

Write for full description.

**BAY CITY DREDGE WORKS**

**BAY CITY** **MICH.**

*These are*

*Rugged Characters*

# Watt Cars

*—so are what they represent!*

In a watch, you look for great delicacy and precision. In a car, you require ruggedness, staunchness, sturdiness—qualities of strength, substantiality, SERVICE. These **CHARACTERIZE** Watt Cars. And the **Precision** is there, too, in abundance—the precision or nicety of workmanship, machining, fit and assembling, and **our preciseness** that only these qualities shall enter into the construction of **our** products. With **you**, it is a matter of **decision.** We shall be pleased to serve you.

## THE WATT MINING CAR WHEEL CO.

**Barnesville, Ohio**

**Denver:**
**Lindroth, Shubart & Co.**
**Boston Bldg.**

**San Francisco:**
**N. D. Phelps**
**Sheldon Bldg.**

**Philadelphia:**
**Edelen & Co.**
**235 Commercial Trust Bldg.**

# Is Your Equipment Ready for Spring Work?

With the coming of Spring will also come heavy demands for sand and gravel.

The extent of your business and the profit thereon will depend both upon your ability to furnish material promptly and economically.

By equipping your machines with HERCULES (Red Strand) Wire Rope you will be assured of dependable service and a low operating cost. This statement is not based upon theory, but upon actual results from the time sand and gravel was first handled with steam machinery until the present.

*Established 1857*

## A. Leschen & Sons Rope Company

ST. LOUIS

New York Chicago Denver San Francisco

A. LESCHEN & SONS ROPE CO. ESTABLISHED 1857 ST. LOUIS, U.S.A.

"HERCULES" (RED STRAND) WIRE ROPE

# You Can—

## If You've Got the Sand

Right now is the time for you to get into a brand-new, all-the-year-round, profit-paying business of your own.

In all sections of the country the demand for Ohio Concrete Roofing Tile is far greater than the supply.

If you have a sand pit you have 75 per cent of the raw materials required.

We can furnish the necessary machinery at a very reasonable figure.

Ohio Tile Machines are simple and easy in operation and come to you ready for immediate production—800 tile per machine a day—**with a net profit of six cents on each tile.**

You can control this paying business in your section **if you've got the sand.**

Write to us—we have some interesting facts for you.

**The OHIO TILE MACHINERY Co**

**Willoughby, Ohio. (Near Cleveland)**

---

The Ohio Tile Machinery Company,
Willoughby, Ohio:

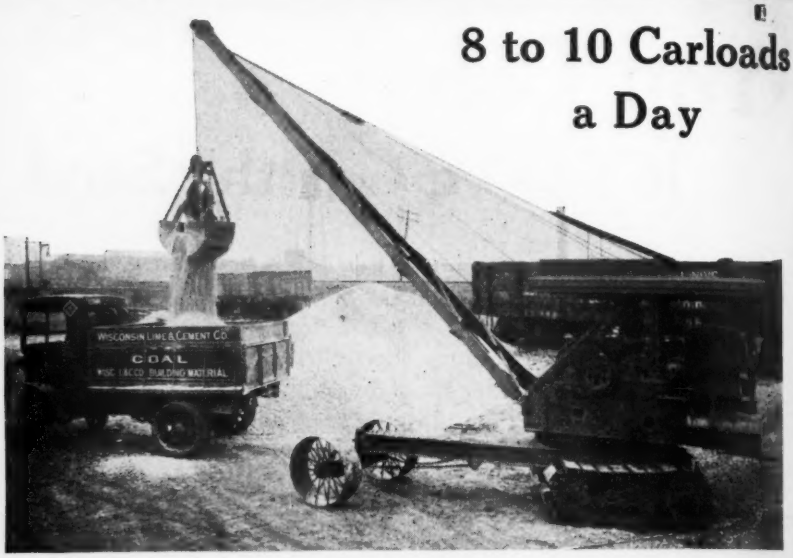
Kindly send me prices and information about Ohio Tile Machines.

Name .....

No. ..... Street

City .....State.....

# 8 to 10 Carloads a Day




THAT is what one Chicago concern, the Wisconsin Lime & Cement Co., is doing with a P & H Excavator Crane—unloading 8 to 10 carloads a day, with a man in charge who is not a high-priced licensed engineer.

The P & H requires no propping or stabilizing, and can be shipped without dismantling.

And it will do many things beside unload sand, gravel, crushed rock, and other loose materials.

Get the whole story in our Bulletin 5X.

**PAWLING & HARNISCHFEGER CO.**

50 Church St., New York
704 Stephen Gerard Bldg., Philadelphia
926 Whitney Central Bldg., New Orleans, La.
47 Fidelity Bldg., Pittsburgh, Pa.

EST. 1884

MILWAUKEE, WIS.

1241 Monadnock Block, Chicago, Ill.
Pittock Block, Portland, Ore.
1125 Central Bldg., Los Angeles
821 Monadnock Bldg., San Fancisco.

**P&H — excavators — back-fillers - tampers**

**Specially Designed Belts for Conveying**

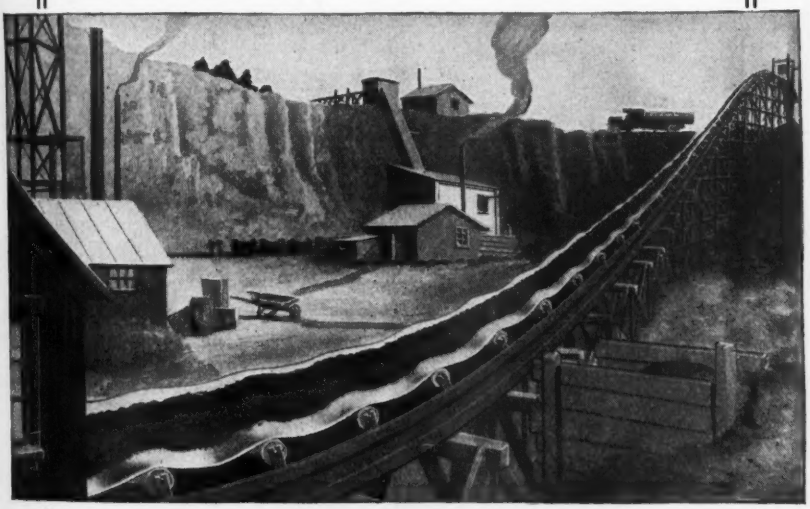
# SAND AND GRAVEL

The problem of conveying these two commodities should not be trusted to any except a strong, sturdy belt, specially built to withstand severe usage which is to be expected in handling sand, gravel, crushed rock, stone, cement and similar products.

## DESERT CONVEYOR BELT

By its construction of extra heavy duck, strong friction and its thick, tough cover, it is the ideal belt for use in quarries, cement plants, washeries and other industries where hard, abrasive articles are conveyed.

*Our belting experts will gladly advise you with your Belting problems*

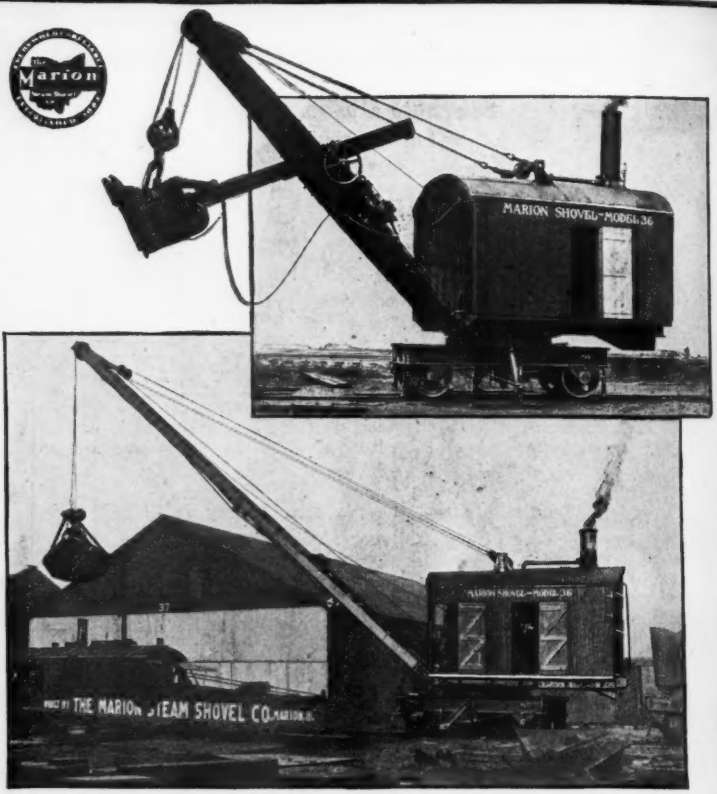


**QUAKER CITY RUBBER CO.**

*Manufacturers of Mechanical Rubber Goods*

**PHILADELPHIA** 629 Market St. **CHICAGO** 182 W. Lake St. **PITTSBURGH** 211 Wood St.

**NEW YORK, 53 Murray St.**




# "Marions" Perform Double Service

You can quickly convert your "Marion" Revolving Shovel into a practical locomotive crane, clamshell or dragline excavator. Simply remove the standard boom, dipper and dipper handle, attach the long skeleton boom and bucket and install a hoisting drum and boom hoist attachment. Units are readily interchangeable and an accurate fitting of each part is assured.

If your work requires a machine with a wide range of action, order your standard Shovel equipped with clamshell, dragline or crane attachments. The extra parts can be fitted to the Shovel before leaving the factory and it will be ready for operation when assembled on the job. The change to the standard Shovel can be readily accomplished at any time.

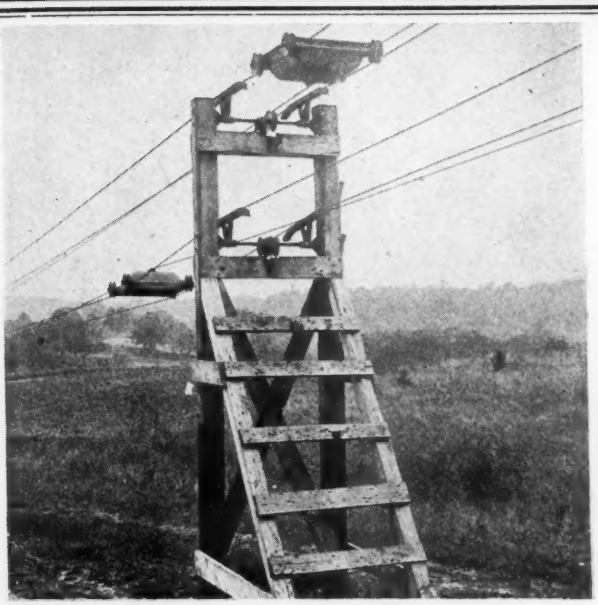
*Write for detailed information.*

**The Marion Steam Shovel Company**

**Established 1884** **Marion, Ohio**

New York Chicago Atlanta San Francisco

Marion



*Above shows 2500-foot tramway hauling crushed stone down mountain side to discharge terminal 500 feet below receiving terminal.*

# AUTOMATIC TRAMWAY

## *Ideal for Quarry or Pit*

This automatic Tramway offers a simple low-cost method of carrying sand, gravel or stone from pit and quarry to discharging bin.

### Easy to Install

Tramway is easy to install and operate. It is carried by towers of strong, simple construction.

### Low Upkeep and Labor Cost

A minimum of power is required to keep the tramway running, as its motion is continuous—no stopping or starting—both loading and unloading of cars being automatic.

It cuts down labor costs, as it is operated by only one unskilled laborer.

If you have a hauling problem, let us tell you how the Lawson Automatic Tramway can help you.

*Write today for our booklet.*

**Interstate Equipment Corporation**

*Shops at Roanoke, Virginia*

**135 Broadway** **New York**

▼

**Loads and Unloads Automatically**

Each car loads itself by automatically opening gate of loading hopper. The hopper is filled from a large receiving bin by the one man required in the operation of the Tramway. Loading does not require stopping the car. The material drops into it while in motion and it continues on its way to the discharging station, where, as it turns over to make the return trip, the material it carries is dumped into the discharging bin.

▲

# ALLIS-CHALMERS KILNS

When the huge United States Air Nitrate Plant at Muscle Shoals, Ala., was erected, kilns to burn the tremendous quantities of limestone to be used, formed an important consideration.

Accordingly a careful selection was made. Allis-Chalmers Kilns were part of the equipment, chosen by lime-producing experts.

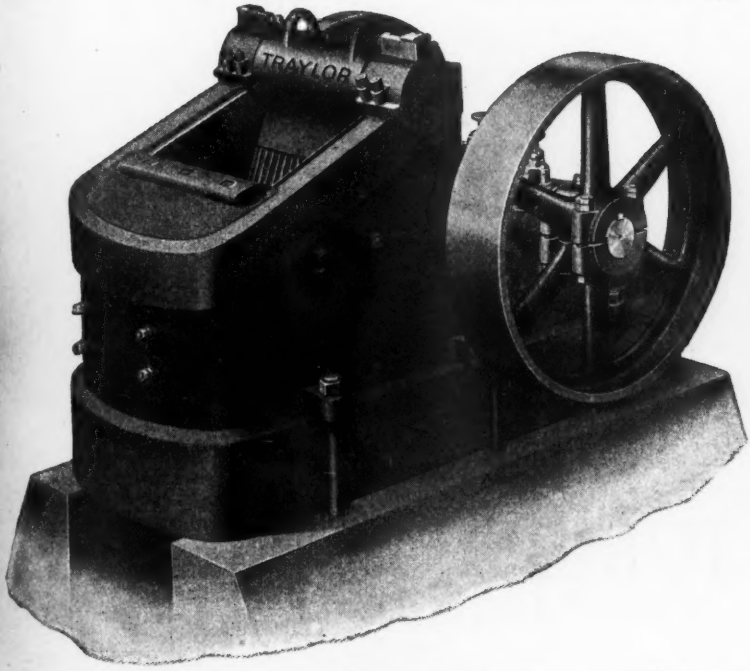
Bear this choice in mind for future guidance: Whatever you need for your plant can best be supplied by the Allis-Chalmers organization. Reliable products, free from fantastic features that simply breed complications.

**Tell us what equipment you are in need of.**

*Write to*

**ALLIS-CHALMERS MFG. CO. Milwaukee, Wis.**

# The Traylor "Bulldog"




## A Jaw Crusher with 80% Less Friction

THIS REMARKABLE ECONOMY, is effected by improvements found only in Traylor "Bulldog" Jaw Crushers—the lighter but far stronger pitman and frictionless toggle system. In place of a heavy and unreliable casting, the "Bulldog" pitman has two wrought steel rods of known strength that mean absolute dependability with the minimum of weight.

The "Bulldog" Toggle System is self-aligning, and with bearings that roll on flat steel, it is frictionless.

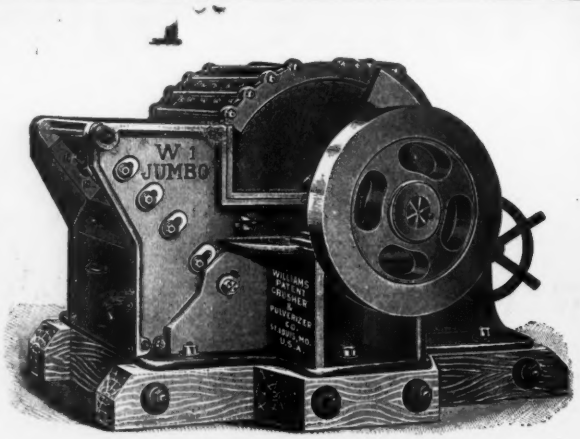
There are many other "Bulldog" features worth knowing. Send for Bulletin QJX-1 TODAY!

## Traylor Engineering & Mfg. Co.

**Allentown, Penna.**

NEW YORK 30 Church St. | PITTSBURGH 211 Fulton Bldg. | CHICAGO Fisher Bldg.

LOS ANGELES Citizens Bank Bldg. | SPOKANE Mohawk Block




# WILLIAMS JUMBO CRUSHERS

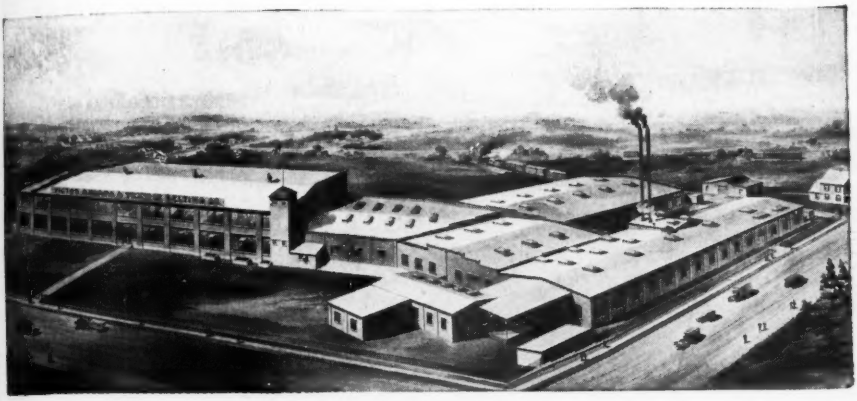
Williams Jumbo Crushers are used in quarries as secondary crushers, taking 10-inch and under limestone, as it comes from the primary crushers, and reducing the material to 1½-inch, 1¼-inch or 1-inch and under in one operation. These machines are built in capacities ranging from 30 tons to 300 tons per hour. Many are now in operation. Complete details concerning these crushers are found in bulletin No. 85-A.

**The Williams Patent Crusher & Pulverizer Company**
**General Sales Dept., 37 W. Van Buren St.,**
**CHICAGO**

**Plant**
**ST. LOUIS**

**67 Second St.**
**SAN FRANCISCO**

# The Plant Behind the Product



*We Manufacture*

## CANVAS STITCHED BELTING
## and
## "V-B" (Victor Balata) Belting

*From the raw bale of Cotton to the finished belt*

*Complete stocks at factory and all branches.*

FOR

## CONVEYING—ELEVATING—TRANSMISSION

Our Canvas Stitched Belting is manufactured from extra heavy duck. Heavy modern machinery sews the belt with the heaviest stitching twine. Stretching is done during manufacture as well as seasoning of belt, assuring perfect stretching and absolute uniformity.

## Victor Balata & Textile Belting Co.

Main Sales Office 38 Murray St., New York City

| Boston | Cincinnati | Chicago | Factories |
|---|---|---|---|
| 85 Purchase St. | 212 E. 2nd St. | 167 N. Market St. | Easton, Pa. |

Secure Packing

Accurate Weights

Sanitary Conditions

-and every link is

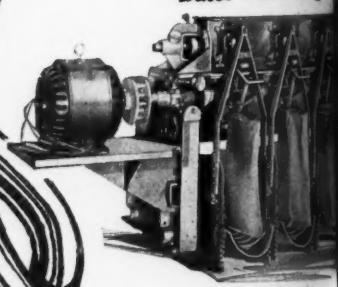
The Valve Bag Company's Packer and the Valve B
part in promoting the hydrated lime indus
methods of packing, storing and shipping
the success of the individual manufacturer
extending his market. The Packer is reli
earless, leakless and self-sealing. The valv
details are yours for the asking.

THE VALVE BAG
TOL
The Urschel-Valve B

Reduced Labor

Increased Speed

The Valve Bag Company's
and
Bates Valve Bag



Rectangular Package

Neat Package

Face Weight Acceptable

Larger Dividends

Attract Capital

## k is Business Asset!

nd the lve Bag have played a very important
e indus y have practically displaced all other
hipping l lime. They have contributed much to
facturer ing an efficient system of packing and
is relia y and accurate. The Bag itself is tieless,
he valv cret," but it's an "open secret," for the

AG ANY OF AMERICA
TOLEDO
Su
schel-E lve Bag Co.

**CORDEAU-BICKFORD DETONATING FUSE**

should be used to detonate the explosive charge wherever the well drill method of blasting is used.

Cordeau is safe. It is practically instantaneous. It is economical. It adds from 10% to 20% to the efficiency of the explosive.

*Write for Booklet Today!*

**The Ensign-Bickford Company**

Original Manufacturers of Safety Fuse
Established 1836
SIMSBURY, CONN.

# TELSMITH—

## THE CRUSHER WITH THE PARALLEL PINCH

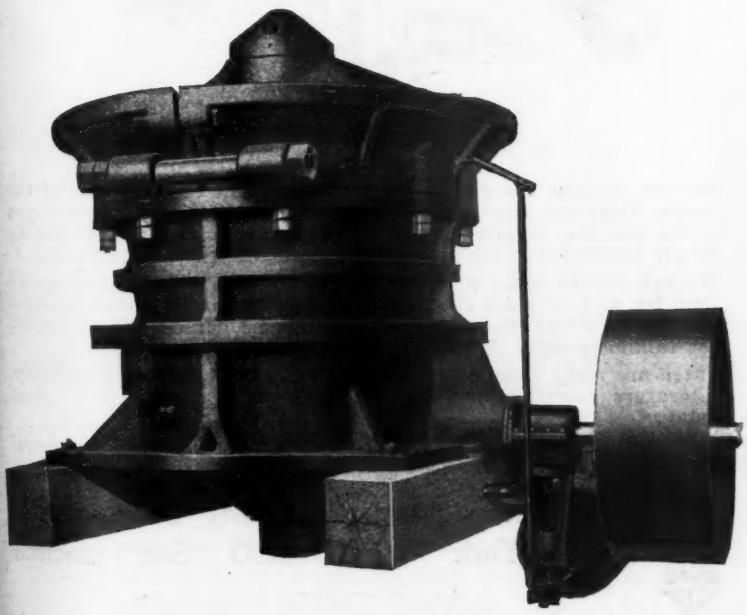
Do you wish to find out for yourself the sterling service that is uniformly rendered to all users of Telsmith equipment? Go to the ULTIMATE AUTHORITY—the user. Here are the names of a few people who work with Telsmith and regard him as an old, reliable henchman:

Defrain Sand Co., Philadelphia, Pa.
Thomas Iron Co., Wharton, N. J.
Charles Warner Co., Wilmington, Del.
E. J. Lavino Co., Philadelphia, Pa.
Thomasville Lime & Stone Co., Thomasville, Pa.
Standard Chemical Co., Canonsburg, Pa.
Webster Stone Co., Irvington, Ky.
W. F. Woodruff, Louisville, Ky.
Nashville Ry. & Light Co., Nashville, Tenn.
Quenelda Graphite Corp., Lineville, Ala.
United Railways Co., St. Louis, Mo.
A. R. Young Const. Co., Little Rock, Ark.
Federal Lead Co., Flat River, Mo.
Stringtown Crushed Rock Co., McAlester, Okla.
Penn Iron Mining Co., Vulcan, Mich.
Hilder Granite Co., St. Cloud, Minn.
Story Rock Co., Bozeman, Mont.
Pacific Mines Corp., Ludlow, Calif.
Phelps-Dodge Corp., Tyronne, N. Mex.
United Eastern Mining Co., Oatman, Ariz.
Rand Consolidated Mines Co., Goudreau, Ont.
Teck Hughes Gold Mining Co., Cobalt, Ont.
Dept. of Highways, Toronto, Ont.

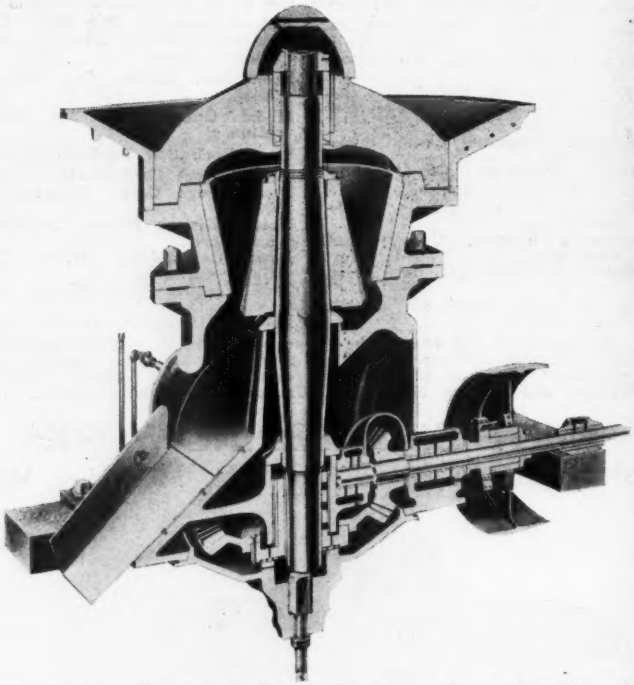
An inquiry to any one of the above will bring to you volumes more about Telsmith equipment than can be told in the most imposing advertisement. Glad to send you our catalog No. 161 Telsmith Primary Breakers and Bulletin No. 2-F-15 (Telsmith Reduction Crushers).

## SMITH ENGINEERING WORKS

**3183 Locust St., Milwaukee, Wis.**



# An Inside View
## Invites Your Study



We are anxious for you to know the internal construction of the Austin Gyratory Crusher. The more you study it, the deeper you probe into the details of design, the more certainly will you be deeply convinced of the great advantages of Austin equipment.

We ask you to study and learn these advantages yourself, rather than for us to explain them to you. For Austin Gyratory features are performance features—substantial mechanical advantages—not talking points.

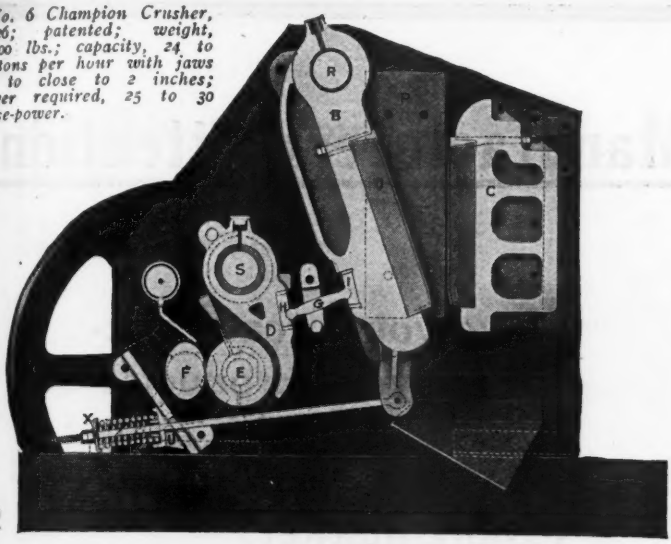
There are eight sizes ranging from 5 to 500 tons hourly capacity. Literature describing each model in detail ready for you. Send today.

Austin Quarry and Gravel Pit Equipment also includes Revolving Screens, Belt and Chain Elevators, Quarry Cars and Hoists, etc.

**Austin Manufacturing Company**

**New York CHICAGO San Francisco**

ALLIED CONSTRUCTION MACHINERY CORPORATION




*No. 6 Champion Crusher, 12x26; patented; weight, 20,000 lbs.; capacity, 24 to 35 tons per hour with jaws set to close to 2 inches; power required, 25 to 30 horse-power.*

# The Champion Rock Crusher

This table shows the large range of Champion Rock Crushers—one for every need. The crushing capacity of each size is guaranteed. Write for full particulars.

| Class Name | Size of Jaw Opening | Jaws Set to Close | Capacity in Tons Per Hour | H. P. of Engine Required | Size of Driving Pulley | Rev. per Min. | Floor Space Required | Extreme Hgt. of Machine | Weight |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 7½x13 | 2 | 8 to 12 | 12 | 38x 8 | 170 | 4-6x5-6 | 4-7 | 5500 |
| 4 | 9x15 | 2 | 12 to 18 | 15 | 48x 9 | 155 | 5-6x6-6 | 5-9 | 8800 |
| 4½ | 10x20 | 2 | 16 to 24 | 18 | 50x10 | 150 | 7-0x7-0 | 6-1 | 12500 |
| 6 | 12x26 | 2 | 24 to 35 | 25 | 60x 9½ | 140 | 6-6x8-6 | 6-2 | 20000 |
| 6A | 13x26 | 2½ | 26 to 38 | 25 | 60x 9½ | 140 | 6-6x8-7 | 6-2 | 20075 |
| 6B | 14x26 | 3 | 30 to 45 | 25 | 60x 9½ | 140 | 6-6x8-8 | 6-2 | 20150 |
| 6C | 15x26 | 3½ | 35 to 50 | 25 | 60x 9½ | 140 | 6-6x8-9 | 6-2 | 20225 |
| 66 | 12x26 | 2 | 48 to 70 | 50 | 60x 9½ | 140 | 6-6x15-11 | 6-2 | 37050 |
| 66A | 13x26 | 2½ | 52 to 76 | 50 | 60x 9½ | 140 | 6-6x16-1 | 6-2 | 37200 |
| 66B | 14x26 | 3 | 60 to 90 | 50 | 60x 9½ | 140 | 6-6x16-3 | 6-2 | 37350 |
| 66C | 15x26 | 3½ | 70 to 100 | 50 | 60x 9½ | 140 | 6-6x16-5 | 6-2 | 37500 |
| 20 | 18x50 | 2 | 70 to 100 | 50 to 60 | 72x12½ | 105 | 11-4x9-4 | 10-0 | 60900 |
| 20A | 19x50 | 2½ | 80 to 110 | 50 to 60 | 72x12½ | 105 | 11-4x9-5 | 10-0 | 61050 |
| 20B | 20x50 | 3 | 90 to 120 | 50 to 60 | 72x12½ | 105 | 11-4x9-6 | 10-0 | 61200 |
| 20C | 21x50 | 3½ | 100 to 130 | 50 to 60 | 72x12½ | 105 | 11-4x9-7 | 10-0 | 61350 |
| 20D | 22x50 | 4 | 110 to 140 | 50 to 60 | 72x12½ | 105 | 11-4x9-8 | 10-0 | 61500 |
| 20E | 23x50 | 4½ | 120 to 150 | 60 to 70 | 72x12½ | 105 | 11-4x9-9 | 10-0 | 61650 |
| 20F | 24x50 | 5 | 130 to 160 | 60 to 70 | 72x12½ | 105 | 11-4x9-10 | 10-0 | 61800 |

# The GOOD ROADS Machinery Co., Inc.

We design, build and install
Complete Crushing, Elevating, Screen, and Conveying Equipment
**General Sales Offices: 833 Bulletin Bldg., Philadelphia, U. S. A.**

*Sales Offices:*
Boston *New York* *Philadelphia* *Pittsburgh* *Atlanta*
*Chicago* *Portland, Ore.* *Los Angeles* *Fort Wayne*

# Manufacturers Attention!

Have you a ready outlet for your products?

Are you seeking an export market?

Have you satisfactory domestic representation?

Let's get together. We can put your goods in market channels in double quick time.

**Beaver Industrial Corporation**

**90 West Street**

**New York**

# Worthington built the first Suspended Shaft Gyratory

1904—Worthington built the first No. 10 Standard Gyratory.

1909—Worthington built the first 10-inch Superior Gyratory.

*Worthington pioneered in large Gyratory and Jaw Crushed construction.*

Worthington Superior Suspended Shaft Gyratory is the original machine of its type, was designed and built by Worthington years in advance of competing machines and has proved successful in over 250 installations ranging in size from 10-inch to 36-inch openings.

**Superior Construction Features**

Distance between bearings of main shaft is 35% less than in standard Gyratories—main shaft is 50% stronger. Working parts are perfected against dust and grit by dust proof seal. Lubrication is forced feed by means of submerged gear type pump which delivers oil to eccentric under pressure, gravity return. Gear and pinions, cut steel running in oil.

*Send for Bulletin P. M. 50*

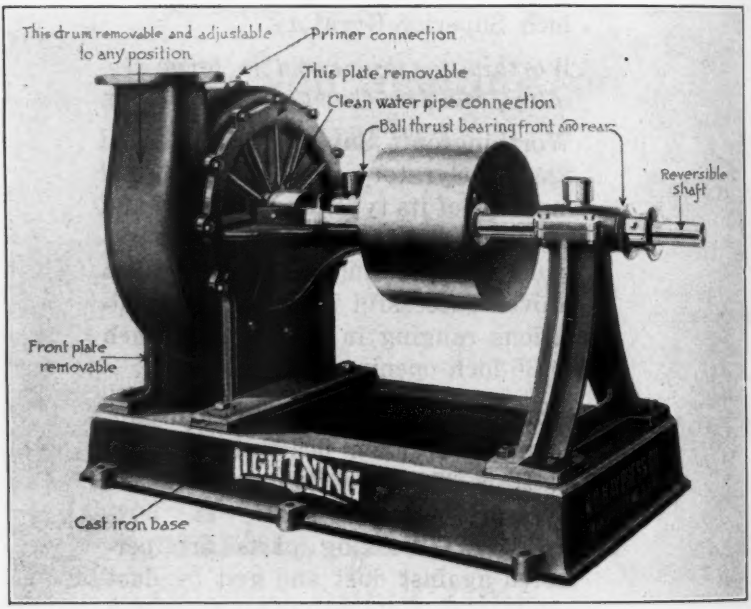
**WORTHINGTON PUMP AND MACHINERY CORPORATION**

**Executive Offices: 115 Broadway, New York City**

*Branch Offices in 24 Large Cities*

# The Lightning Sand Pump

The ideal pump for sand companies and contractors—easy to operate, easy to adjust, easy to replace parts.

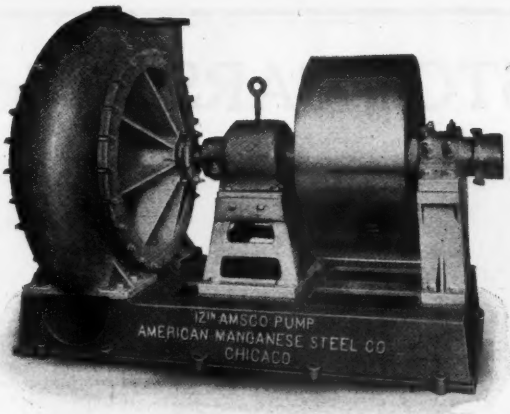



Write for prices and full information.

*Address Pump Dept.*

## Kansas City Hay Press & Tractor Company

**Kansas City** **Missouri**




AMSCO

## *Sand and Gravel Pumps Give Satisfaction*

Of rugged construction, built for hard service. They stand up day in and day out, month after month. Their operating efficiency—percentage of days on active duty—is the reason they are bought in ever increasing numbers.

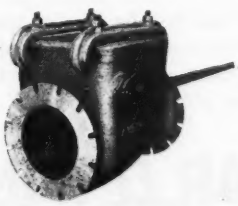
***Manganese Steel*** for shells, runners, and side plates gives longest wear.

***Slotted Flanges*** in side plates dispense with troublesome stud bolts. Solid ring gaskets are used.

***Thrust Collar*** ball bearings reduce end thrust friction losses.

***Balanced Runner*** and extra heavy shaft make the AMSCO Pump a smooth running machine.

AMSCO **Flap Valves**
**Pipe**
**Elbows**



**Write for Pump Bulletin.**

# American Manganese Steel Co.

General Offices: 1875 McCormick Building, Chicago

**Western Sales Office:** Newhouse Bldg. Salt Lake City
**Pacific Coast Office:** Insurance Exchange Bldg. San Francisco, Calif.
**Eastern Sales Office:** Hudson Terminal Bldg. New York City

**Foundries:** Chicago Heights, Illinois—New Castle, Delaware—Oakland, California

# EASTON CARS "on the job"

Your share of that $633,000,000 that, it has been estimated, will be spent on the roads of this country during 1920 will be big or little *according to your facilities.*

Handling large quantities of crushed stone economically calls for an industrial railway system of some sort. And the more closely the system fits the particular situation, the greater the economy.

Easton Industrial Railway Service includes not only the intelligent layout by engineers with a quarter of a century's experience in that particular work, but the manufacture of the proper cars—specially designed, if some one of the great variety of standard Easton cars will not best serve—and the track, switches, turntables and minor details of the equipment.

Easton experience is matched by Easton manufacturing facilities—both at your disposal for increased economy in your plant. Our recommendations await only the details of your problem—and with no obligation to you.

**EASTON CAR & CONS'T'N CO.**

**CHURCH AND DEY STREETS, NEW YORK**

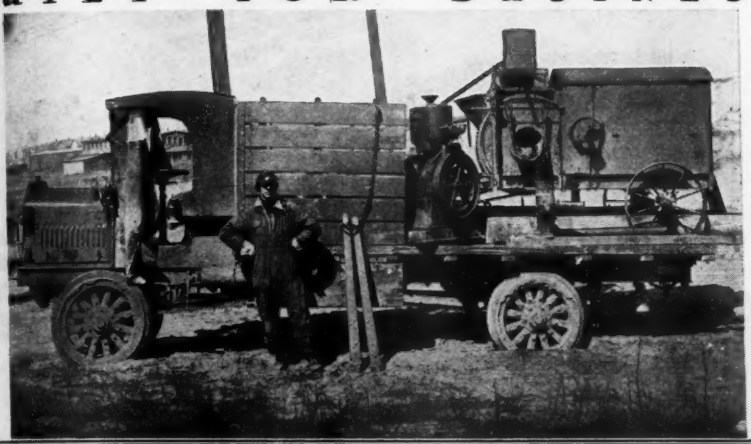
Factory: Easton, Pennsylvania

**Boston** **Chicago** **Detroit** **Philadelphia** **Pittsburgh**

2057-E

# DUPLEX TRUCKS

BUILT FOR BUSINESS



**The Duplex Limited**

Built to handle a normal load of 3,000 pounds or a maximum of 5,000 pounds, including body, at a speed limited only by legal restrictions—or from 5 to 30 miles on high.

Such speed in the Duplex Limited does not depend upon gear ratio but upon engine power—greater power in fact than is usually specified in trucks of equal capacity.

The Duplex Limited was constructed in response to the insistent demands of Duplex owners and dealers for a general purpose two-wheel drive, medium capacity Duplex Truck designed and built to the high mechanical and proven service standards of the famous heavy duty 4-Wheel Drive Duplex.

And the Duplex Limited is worthy of the Duplex name—for it is a Duplex, every inch of it, from tail light to radiator cap.

4-cylinder, enclosed type motor—water cooled—cast enbloc, bore 4-in., stroke 5¼-in. 3-point suspension; Pneumatic Cord tires; 145 in. wheel base. Equipped with windshield, electric lighting and starting, Ammeter, Boyce motometer, speedometer, electric horn, tools, jack, rim wrench, front fenders, Alemite grease gun. Driver's seat without extra charge. (Power tire pump at extra charge.)

Write for booklets describing

**DUPLEX LIMITED**

$2575 f. o. b. Lansing

DUPLEX BUILT FOR BUSINESS

## In Concrete and Quarry Hauling the Duplex 4-Wheel Drive Saves Time and Conquers the Most Difficult Road Conditions.

The hauling of crushed stone over roads that are being made or repaired is a highly specialized job of transportation.

It usually calls for the moving of ponderous loads over roads that are in bad condition—or where there are actually no roads at all.

The fact that the Duplex 4-Wheel Drive is designed in engineering principle and construction to haul heavy loads and to transport them over going that is ordinarily impossible to other trucks, explains the decided preference for the Duplex in concrete and quarry work. It is one thing to make a truck strong enough to carry such loads and an entirely different problem to build a truck that travels steadily under tremendous loads without undue strain on the mechanism or construction of the truck.

Power—applied power in the wheels is the underlying principle of the tremendous hauling power of the Duplex 4-Wheel Drive.

The front wheels do not merely support the load. Every wheel has power. The front wheels pull at the same time the rear wheels push.

The Duplex will keep going as long as one wheel touches the ground—and the load travels continuously over roads that would stall any rear wheel drive of like capacity.

As Schultz and Liken, road contractors of Sebewaing, Michigan, testify: "In the muck the truck would sink to the frame but we could not stick it—it would travel along just the same. We have hauled gravel out of a pit where no other truck would have a chance and with the same load we crossed a creek that has a steep bank.

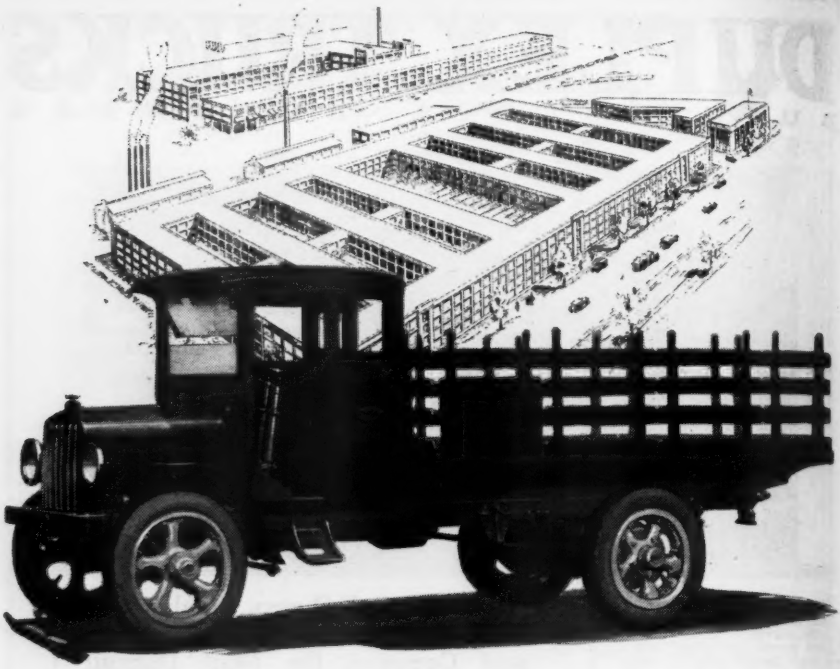
The reason for Duplex superiority is that it is designed and built to haul heavy loads over impossible roads, not merely to hold them.

Write us for information that will apply to your own business. Talk to the Duplex Dealer. His experience in your own particular problems is worth knowing. He can show you conclusively why the Duplex is a better investment.

## Duplex Truck Company

**Lansing • Michigan**

*One of the Oldest and Most Successful Truck Companies in America*



# A Truck and Its Traditions

There could be no more eloquent testimonial to the stamina of Paige trucks than their demonstrated ability to perform an unusually large quota of severe haulage tasks, day after day and week after week, with scarcely a lay-up for either adjustment or repairs.

Performance of such dependable character is naturally a source of great satisfaction to us. For we measure our success as truck builders not so much by the larger number of Paige trucks in use as by the service which each individual truck renders to its owner and, through its owner, to the business world at large.

We prize very highly the respect in which the name Paige has been held during all of the ten years we have been building motor vehicles. And we shall continue to follow the policy of building into our products such honest excellence that they will always merit the public confidence reposed in them.

The pride which we take in our products gives you definite assurance that when you buy a Paige truck its performance will be of the same high character as that of the many other Paige trucks which have made good in actual service. The Paige nameplate is a guarantee on which you can always safely rely.

PAIGE-DETROIT MOTOR CAR COMPANY, DETROIT, MICHIGAN

*Manufacturers of Paige Motor Cars and Trucks*

PAIGE

*The Most Serviceable Truck in America*

MOTOR TRUCKS

*Clearing up after the job. 85 to 95% of the live load is carried by the rear axle of the Packard—with less vibration and longer life for the truck*

# Is the Supply Dealer Getting All He Pays For

THE Supply Dealer who begins to keep accurate costs is often amazed at what he pays for idle time.

Buying a truck on the basis of price, and trusting the driver to "nurse" it along means longer hours on the road and a higher cost per trip.

The Supply Dealer who wants all he pays for will get exact figures on trucking costs, and then standardize on the most economical truck he can find.

Here are some facts, summarized from the National Standard Truck Cost System operating in 16 cities.

Packard Trucks show 10 per cent lower gasoline costs than any other.

They show 30 per cent lower repair costs than any other.

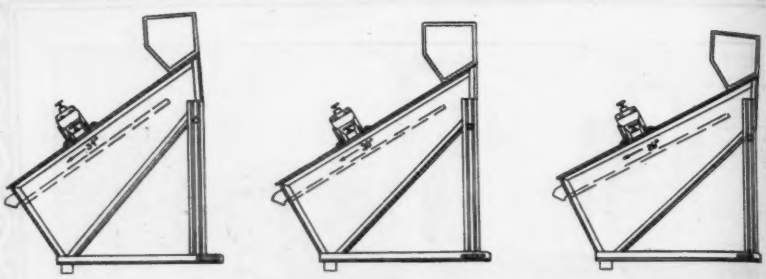
They show a lower wage cost per ton-mile transportation—make the trip in shorter time.

Ninety per cent of all truck owners who have used the System for a year or more and have compared the Packard with other trucks have standardized on Packard.

The thinking Supply Dealer knows the significance of these transportation facts when applied to his own hauling problems.

*"Ask the Man Who Owns One"*

PACKARD MOTOR CAR COMPANY, *Detroit*



# Intense HUM-MER Vibration

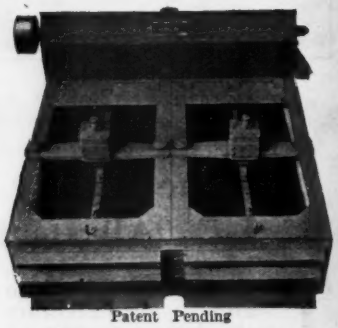
## makes lower screening angle possible

Where close sizing is required, the fact that the HUM-MER Separator can be operated at a low angle will prove especially advantageous to the user.

Inclined screens that are vibrated by mechanical means must of necessity be operated at a steep incline as mechanical vibration is not sufficient to keep the material moving down the screen.

The combination of "drumhead" tension with high-speed, electro-magnetic vibration in the HUM-MER Separator, makes it possible to operate at a low angle, producing a closer separation than has ever been possible on inclined screens.

Let us demonstrate by actual test what the HUM-MER would do on your material.



Patent Pending

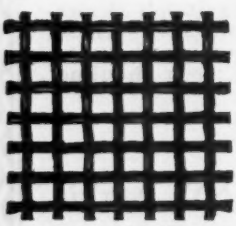
**Hummer Separator**
**For Screening Silica, Sand, Gravel, Limestone and all other Rock Products**

# THE W. S. TYLER COMPANY

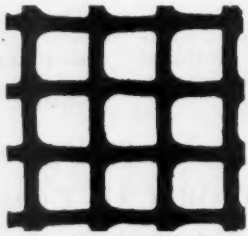
**Manufacturers of Woven Wire Screens**

**CLEVELAND, OHIO**

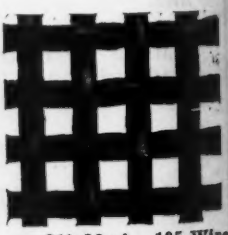
*Write us about your wire cloth requirements.*



**6 Mesh; .054 Wire**



**3 Mesh; .080 Galvd.**



**3½ Mesh; .135 Wire**

# CRESCENT BELT FASTENERS

*"Make Good Belts Give Better Service"*

"They make good Belts give better SERVICE"

They save time, labor & Belting

They insure Continuous Production

They sustain the belt's full strength

They insure full power Transmission

There's a Crescent Booster near you. Write us and we will gladly give you his name

Crescent Plates

CRESCENT BELT FASTENER COMPANY,
381 FOURTH AVENUE, NEW YORK
Branches Birmingham England Toronto Canada
Distributors Throughout The World

Crescent Rivets

## Hercules Explosives for the Quarryman

WE are facing a great era of construction; an era of heavy demand for all quarry products.

The questions of production and costs are of vital importance to the quarryman and the solution of these questions depends to a large extent upon the explosives he uses.

Hercules Powders are increasing the output and cutting costs in thousands of quarries. *And they can do it in yours.*

If you have any special blasting problems write the nearest office of the Hercules Powder Co. Our Service Department will be glad to advise you or, if the occasion warrants it, to send a man to demonstrate in your own quarry the efficiency of Hercules Dynamite

**HERCULES DYNAMITE**

**HERCULES POWDER CO.**

| | | |
|---|---|---|
| Chicago | St. Louis | New York |
| Pittsburg, Kan. | Denver | Hazleton, Pa |
| San Francisco | Salt Lake City | Joplin |
| Chattanooga | Pittsburgh, Pa | Wilmington, Del. |

## Are you getting the rock out at *Lowest Cost?*

IN THESE days of high operating costs it is important to know exactly how much you are paying for every ton of rock—and whether that figure represents the **lowest possible cost.**

Hundreds of quarries that calculate their costs on a scientific basis (the only way they ought to be figured) are saving money by using

## AETNA EXPLOSIVES

You get maximum tonnage with Aetna Explosives because they are manufactured according to the highest standards. No variation in quality or power. The full punch is back of every shot.

Aetna Explosives reach their highest point of efficiency when used according to the formulas worked out by our Engineering Department and in connection with Lion Electric Blasting Machines and Lion Electric Blasting Caps.

**AETNA EXPLOSIVES COMPANY**

**Incorporated** **165 Broadway, New York**

**BRANCHES**

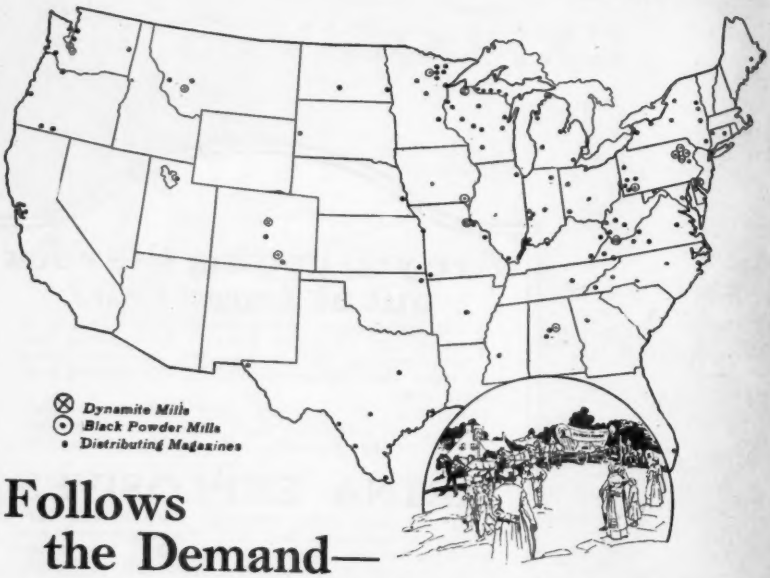
Birmingham, Ala. Joplin, Mo. St. Louis, Mo.
Buffalo, N. Y. New Orleans, La Pittsburgh, Pa.
Chicago, Ill. Norristown, Pa. Pottsville, Pa.
Denver, Colo. Louisville, Ky. Roanoke, Va.
Duluth, Minn. Wilkesbarre, Pa.

AETNA

**It does the work!**

DU PONT

# Explosives Service *Everywhere*




## Follows the Demand—

In 1812—
*Hauling Powder to Lake Erie.*

FOR 118 years it has been our constant aim to deliver explosives where they were needed—and **when** they were needed.

In 1812 our wagon trains delivered the powder to Perry which made possible his immortal victory on Lake Erie. In 1920 our motor trucks are carrying explosives from Du Pont mills and magazines into practically every great industrial district in America to aid production and construction everywhere.

Prompt delivery is but one feature of Du Pont Service. It is our aim to see that our customers use the kind of explosives that will give the best results for their particular work at the least expense—and that they are handled, stored and used most efficiently. Du Pont Service saves hundreds of thousands of dollars every year for our customers.

There is a Du Pont mill or magazine near you. Write us about your problems. It is our business to solve them.

**E. I. du Pont de Nemours & Co., Inc.**
**Sales Department: Explosives Division**
WILMINGTON, DELAWARE

**Here's the Loader that Pit and Quarry Owners, Road Builders, Contractors, Manufacturers and Others Have Been Waiting For.**

# Jeffrey

## TYPE "K" RADIAL LOADER

Long, flexible spout enables operator to distribute load without shoveling.

## For the Rapid Handling

of sand, gravel, crushed stone, slag, ashes, coal, coke and other loose materials.

Digs 8 to 10 feet into the pile—clear up to its driving wheels.

### Three Wheel Support

Will turn a complete circle with either drive wheel as a center.

### Built for the Heaviest Work

Large wheels enable it to pass over soft, rough or uneven ground.

**Write for new bulletin No. 288-G, fully describing the Type "K" Loader and containing a number of interesting installation views.**

**The Jeffrey Mfg. Co.** 990 North Fourth St. **Columbus, O.**

BRANCHES:

New York, Philadelphia, Pittsburgh, St. Louis, Dallas, Scranton, Montreal, Boston, Cleveland, Chicago, Birmingham, Milwaukee, Denver, Detroit, Seattle

*Manufacturers of Pulverizing, Conveying and Elevating Machinery; Chains; Buckets; Sprockets; Electric Trolley and Storage Battery Locomotives; Portable Loaders, etc.*

*Handle it Mechanically*

# Even Shovelers and Loaders Being Replaced by Machinery

Scarcity and cost of labor is forcing upon us the realization of the fact that things must be done mechanically. Pit and Quarry men may wonder how the work which, ordinarily, has been done by laborers with hand shovels, could possibly be done by machinery. It not only can be done—it IS being done!

## B-G Self Feeding Bucket Loaders

B-G Self Feeding Bucket Loaders are finding favor in pit and quarry—or any place where material such as crushed rock or dirt is to be handled in bulk.

The B-G Loader may be set to work upon a pile of gravel, for example. Slowly, surely it will eat its way into the pile, feeding itself automatically with the material which may be loaded into wheelbarrows, wagons, cars or conveying apparatus.

Think how the B-G would help you in your business. Think of the labor it would save, how much more it would enable you to get done with your present force of men!

In order that you may know just what the B-G Material Handling Machines will do for you, how and why, send for Catalog N. And if you desire we will send an engineer to help you select equipment and apply it to your business. Branch offices, located in all sections of the country, assure you of continued attention and service.

**Barber-Greene Company**

AURORA, ILLINOIS, U. S. A.

BRANCH SERVICE AND SALES OFFICES:

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|---|---|---|---|---|---|---|
| New York | Hartford | Detroit | Chicago | St. Louis | Salt Lake City | New Orleans |
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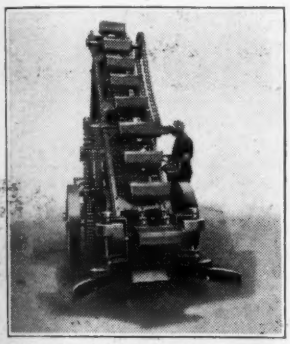
| Norfolk | Louisville | Pittsburgh | Minneapolis | Kansas City | San Francisco | Savannah |
| Salem | Cleveland | | Denver | | Portland | Utica |

*Southern Branch: Birmingham, Ala.* *Canadian Agents: Mussens Limited, Montreal, Winnipeg, Toronto, Vancouver*

EXPORT DEPARTMENT
ALLIED MACHINERY COMPANY OF AMERICA

# AUSTIN

# Wagon Loader



Ready for Operation with Digging Arms Extended.

## feeds itself

The Austin Patented Self-Feeding Device is the greatest improvement since the introduction of mechanical wagon loaders. The feeding arms push the material directly into the path of the buckets, keeping them full. The increase in efficiency makes the Austin Loader an extremely profitable investment.

Self-propelled loader of the multiple-bucket type. Travels forward or backward. Neither buckets nor feeders have to be stopped, whether backing or going straight ahead.

Unequalled for general quarry work. Send for catalog and descriptive literature. W-L-16.

**F. C. AUSTIN CO., Inc.**
Railway Exchange Bldg.
CHICAGO, ILL.
D. L. 116
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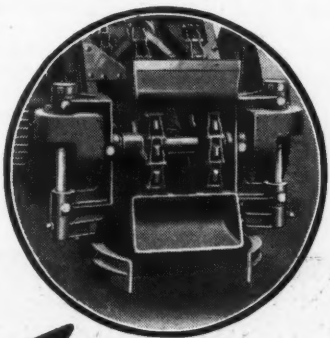

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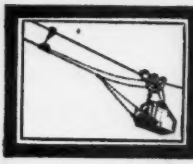
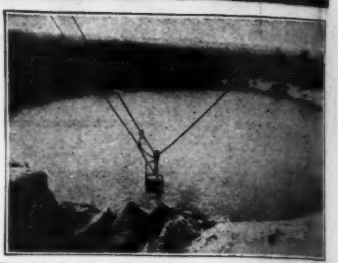


# SAUERMAN
## DRAGLINE CABLEWAY EXCAVATORS



AMONG the producers assembled for the annual convention of the National Association of Sand and Gravel Producers at Chicago on February 11, 12 and 13, one sentiment was unanimous. This was that if the railroads furnish all the cars needed, the sand and gravel industry will have its banner year and contractors and road officials need not worry about any lack of aggregates forcing them to open their own pits.

This optimism will be justified if all the producers exercise the same forethought as these leaders of the industry.

For we have noticed that these leaders —many of whom are using Sauerman Dragline Cableway Excavators — are bringing their plants to a high state of efficiency and arranging to increase their output if necessary to meet the demands in their selling territories.

Now is the time for all producers to prepare. If the demand for sand and gravel in your territory appears to warrant you in enlarging the capacity of your present plant or in opening a new pit, take your proposition up with us at your earliest opportunity.

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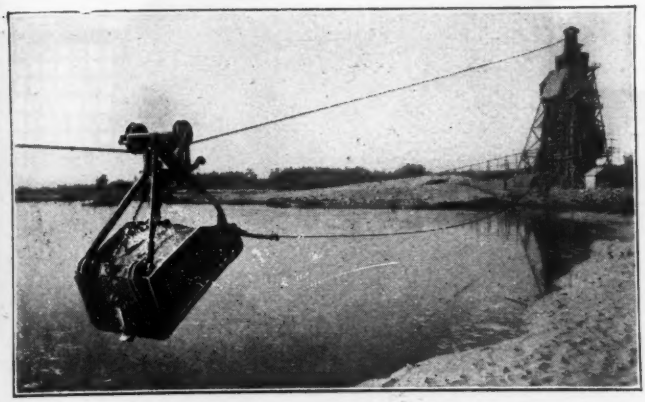

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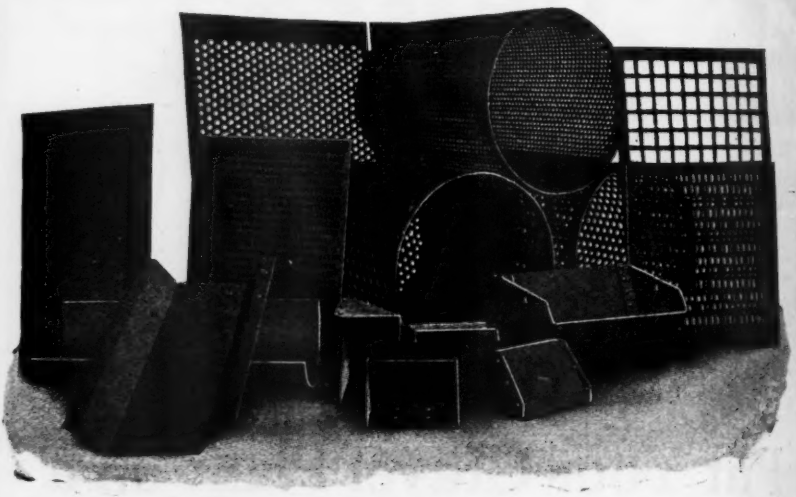

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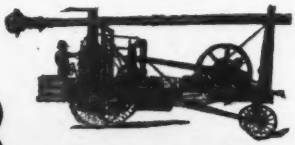

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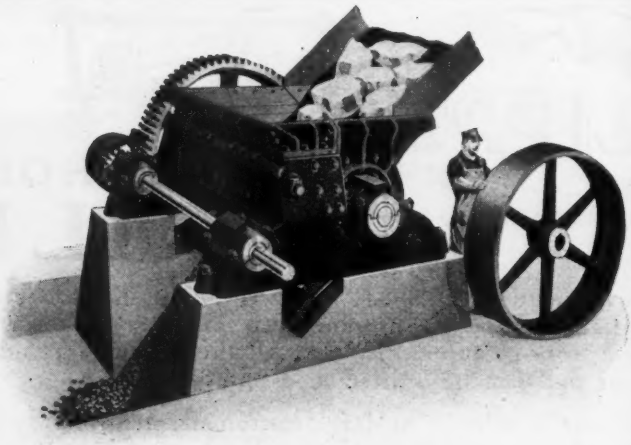
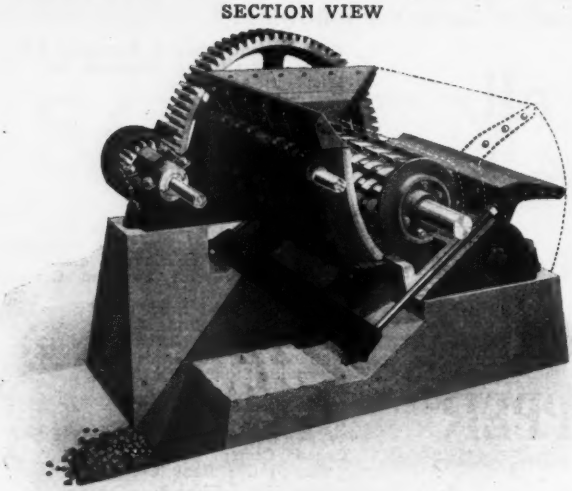


SECTION VIEW



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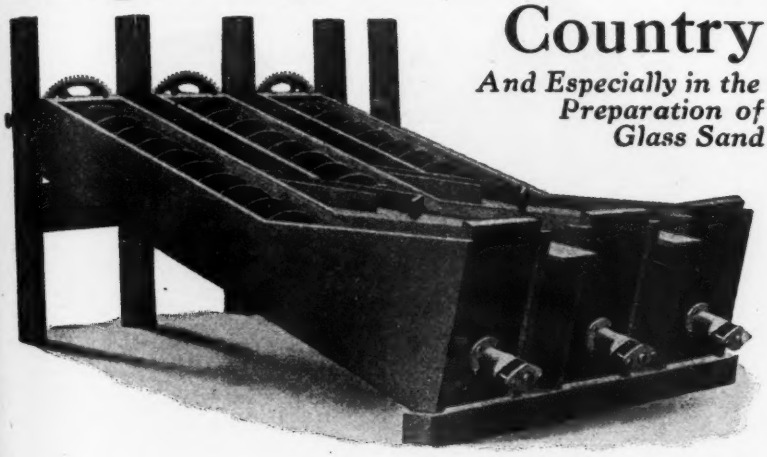

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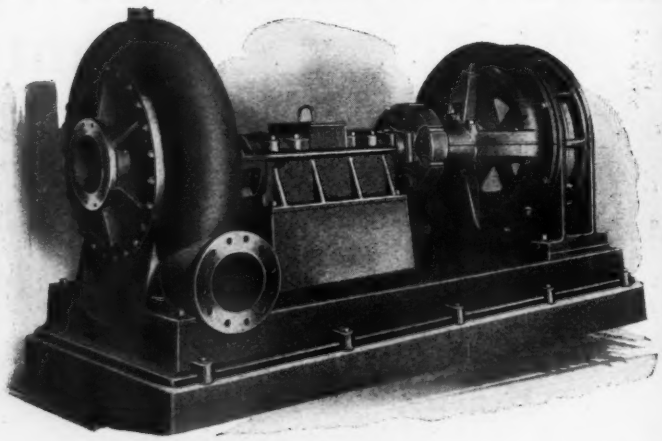

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# Pit and Quarry

*A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime*
*Member Audit Bureau of Circulations*

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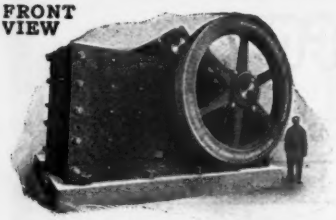
FRONT VIEW



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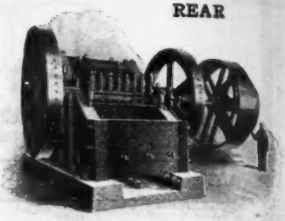

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This machine has given constant satisfactory service and is now still in daily operation. Since that time the Buchanan Crusher has always been the choice of conservative engineers and today there is not one of our large machines but has given entire satisfaction to its owners.

The Buchanan is the Pioneer Large Jaw Crusher embracing every real improvement in Jaw Crusher design including several patented features.

All BUCHANAN crushers are furnished with our patent adjustable jaw stroke. Jaw plates, toggle bearings and cheek plates of Manganese steel.

The entire construction excepting the fly wheels is of the very best quality of Open Hearth Steel, heat-treated and annealed. Pitman is parting, spring-balanced and water-jacketed. All joints subjected to strain are machined. Twenty-four sizes in Type "C," from 24x36 in. to 66x84 in. Send for bulletin No. 10. Smaller crushers twelve sizes, ALL STEEL, from 5x12 in. to 24x 36 in. Send for Bulletin No. 9.

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# Pit and Quarry

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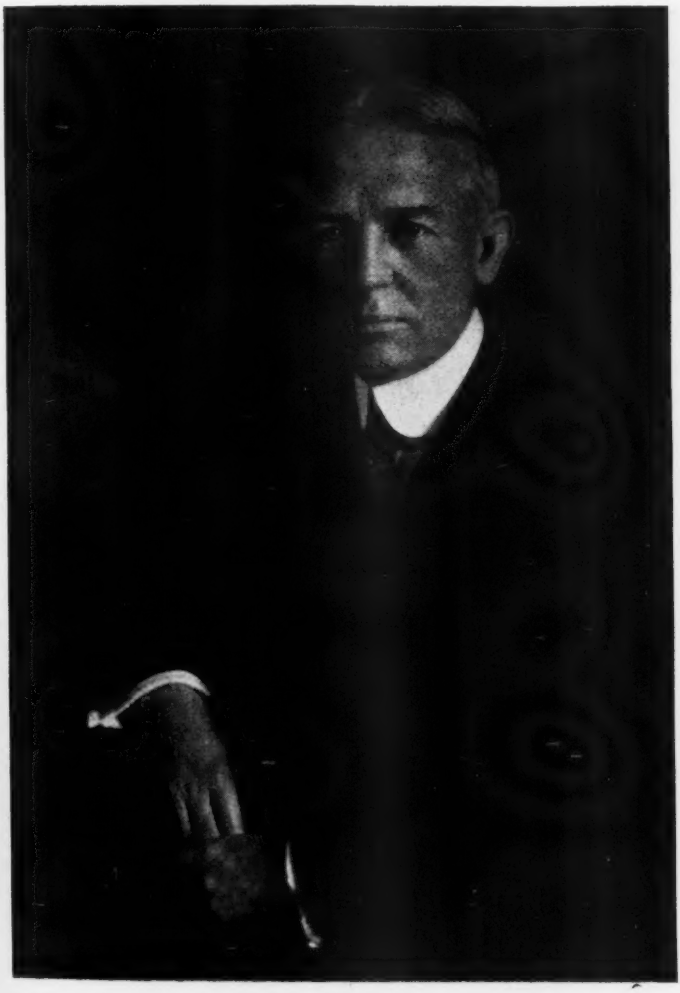

JOHN RICE
President General Crushed Stone Company, Easton, Pa.

## Chosen President of Crushed Stone Association

# Industrial Relations

## A Symposium on Profit-Sharing, Bonus Systems, and Other Aspects of the Relations Between Employer and Employe, as Developed at the Chicago Convention of the National Association of Sand and Gravel Producers

J. K. JENSEN
Janesville Sand and Gravel Company, Janesville, Wis.

So long as the directing power in industry is actuated by selfish motives it must of necessity think and talk and act against the true interests of the workers. So long as the workers are actuated by selfish motives they must of necessity think and talk and act against the true interests of their employer. If both parties will apply the Golden Rule and begin to consult the interests and rights of the other party the whole difficulty will be in process of solution.

This is not wanton theorizing. There is abundant evidence in American industrial life today which shows that wherever men have been actuated by a broad spirit of fair play industrial strife with all its attendant evils have vanished into thin air.

Inasmuch as the directors of industry are supposedly occupying higher ground in general culture and education than are the workers, it is but reasonable to expect them to take the initiative in bringing about a cessation of the destructive warfare between the two forces in industry. One thing is absolutely essential before anything worth while can be accomplished; namely, that the employer, in approaching this whole question, does it, not because it is good business, not because it will pay him well to assume a different attitude toward his employes, but simply because it is right and the men are entitled to it. Let it be done because simple justice demands it. If this is the basis of his action he will be able to solve the problem. If he is actuated by selfish motives and governed by expediency he will fail miserably.

Why is it that you have a greater interest in your business than your wage earners? Why is it that you do not keep track of the number of hours you give to your business? Simply because there is a direct relation between your efforts and your compensation for these efforts. The man working for you for a daily wage is no different than you. Give this man, who is like unto yourself, the same relation to his work that you have to yours and he will respond in exactly the same manner. Let there be the same relation between his efforts and the compensation for his efforts that you claim for yourself and you will have solved your labor difficulties.

I am fully aware of the seriousness of the whole problem of profit sharing and of the many ramifications of the subject. I think it is unwise to rush into it and establish profit sharing schemes and plans without first taking plenty of time to think them over and feel one's way. To my mind the chief thing is the mental attitude. If that is right the method is secondary.

There are certain fundamental principles involved in any profit sharing plan that is to live.

First: The first object in any industry before any thought can be given to profit-sharing to get in an amount annually sufficient to cover operating expenses, depreciation and a fair return on honest investment.

Second: Profits above this should be divided between capital and labor.

Third: These profits should be left in the business. The directors' share should be carried to surplus and the workers' share should be distributed to them in some form of security representing an interest in the business.

If a program similar to this is followed you will not only have profit sharing, but you will have profit saving; and the former is of little account without the latter.

In our case we announced to our men that our board of directors had passed a resolution inaugurating profit sharing, based on the conviction that the worker who gives loyal and efficient service is entitled to share in the profits which are partly derived from that service. We made it clear at the start that we had no finished plan, but that as time went we hoped to work out a plan which would suit our particular business. The first definite result of our board's action was to announce to the men that every man who had been in the company's employ for at least six months was entitled to one week's vacation each year with full pay. The second step was that each month a certain amount of the company's earnings would be divided among all employes, each man receiving a certain percentage of his monthly wages. This percentage is at present more or less arbitrary and we fully realize that this is but an imperfect step toward the goal which we have set.

Once a month we gather all the company's employes and hand each man his envelope containing his percentage of the earnings. At these meetings we acquaint the men with the production records of each plant during the preceding month. We urge everyone to offer suggestions of whatever nature and if they have any value they are followed. These meetings bring directors and workers into closer touch with one another, which in itself is of great value. On the whole I believe it is safe to say that our men have a new interest in their work, they are beginning to think of their own efforts in relation to their individual income. The turnover has fallen off very materially, which is of the most vital importance to the successful operation of any business.

---

V. O. JOHNSON
Lincoln Sand and Gravel Company,
Lincoln, Ill.

A real profit sharing plan must mean just what the words indicate: That it is a sharing between capital and labor that makes that capital effective. If the capital and the labor combined make money, capital takes a part and labor takes a part. That sort of real profit sharing should tend to create a community of interest, and that is the thing that any profit sharing, bonus plan, any kind of stock ownership, should bring. That is the one thing that the employer has a right to expect and that the employe should really give.

There are no general laws that can be laid down, but there are a few elements which ought to be present in any successful plan. One of these is that in each company the plan adopted should be satisfactory to the particular needs of each employe.

Another element is an increase of interest in the job. If the profit sharing plan is based on production, the figures should be kept in such a way that day by day, week by week, month by month, the employe who will be benefitted can know just what prog-

ress is being made. He likes to be able to figure out for himself, "Well, if we do so many cars or so many tons this month, so much is mine." He wants it simple; he wants it definite, and he wants it soon. He does not want to wait until the end of the year. He does not want to be handed out a little stock and say, "Well, some day I will be getting some dividends on this." He wants it now.

Applying a few of the principles I have touched on to the sand and gravel industry, I will say that the profit-sharing plan in our industry should educate our employes to the problems of our business. Whatever plan is adopted should teach them some of the risks that we run. It should show them something of the amount of capital that we put in. They should realize some of the problems of the office, of the sales, of the cost keeping, and what the government does to us if we are fortunate enough to make some profits. It should be educational to the labor, and insofar as it is, it forestalls the bolshevism that seems to be rampant in this country at this time. It makes him more appreciative of the problems of the employer.

---

B. H. ATWOOD

Interstate Sand and Gravel Co.,
Chicago, Ill.

I have been trying to work out a profit sharing or dividend scheme for our business and I have been trying to avoid some of the rocks that people have told me are in the way. I have not yet solved all of the problems. I have arrived at this stage: I have figured up what our prospective cost is for running the business for the year 1920, based on our past experience. I make an estimate as to what we will realize for the material produced. Then we find out how many tons we have got to produce in order to break even.

Now, suppose that there shall be no bonus or no profit at all paid to anybody until that number of tons has been produced. After that we begin to make a profit; and the thing that I cannot determine is how are we going to divide that profit between the company and the employes? Remember this, that the employe does not carry any losses; the company must stand that. We have also got to remember this; that any present paid on the payroll is an added wage; it is not a profit-sharing plan; it is not a bonus. It is an added wage, and the employe will demand it year after year—that or more.

Now, I want to arrange this bonus so they will be interested in seeing the plant produce enough material to make back what it has cost to operate, and then I want them to share, and share equitably, in the income above that. I don't know how to do it. I wish somebody would help me.

There is a company down in Massachussetts which has adopted this profit sharing plan: They divide their profits fifty-fifty with the employes, but they only allow the employe to draw one-half of his share, that is, 25 per cent of the profits. They set aside the other 25 per cent in a fund which is the property of the employes and which will be drawn upon to make up losses in the proportion of fifty-fifty. In other words the firm stands half of the losses and this fund stands the other half of the losses. When that fund is exhausted, due to excessive and continued losses, the firm makes up any shortage. Now, in dividing this profit that we will get when we have produced more than the number of tons that we must produce to break even, we must provide some sort of sinking fund to take care of the lean year.

A. A. ROTSTEIN
Beloit Sand and Gravel Company,
Beloit, Wis.

We realized shortly after the United States declared war with Germany, and many of our men were being drafted, that there would be a shortage of labor and we decided that we were going to put our men on some kind of a profit sharing plan. We started out by giving our superintendent, who is held fully responsible for anything that happens, an allowance of 25 cents for every car that was turned out. Our other laborers in and around the plant were allowed 5 cents per car. In that way we kept our men satisfied. We have increased our production by doing so to the extent of paying that bonus. On that basis it did not cost us anything to make that payment and it has kept the men content and they are always willing to do more than their share of the work. That has been proven many times, as I have often noticed when their time cards come into the office. Sometimes they would show 11 or 12 hours of work. I would call up the superintendent and ask him how it happened that on this day they had put in 11 or 12 hours. He has said: "At quitting time there were two or three hours of work left at the plant; and as we have our cars generally placed in during the night, the men wanted to get out those cars before they went home, and they would work anywhere from six to eight or nine o'clock, if necessary, to get out two or three cars so that they could pull a string of empties in."

Whenever a new man comes on the job, the men working around the plant (not the superintendent but the men) will call his attention to the fact that they are getting a bonus of 5 cents a car and that they expect him to do just as much of the work as the rest of the men to help get the bonus, without stalling on the job.

Another plan we have is one we call the suggestion plan. We allow our men anywhere from $5.00 to $10.00 for each suggestion they make which is adopted by us and proves practical. As a little illustration: last summer in the busy time there happened to be one or two days when we were fortunate enough to get some cars, one of our men who had been working for us just about two days came up to me and said, "Why can't we divide our crew up during the noon hour and have half of the men working during half of the hour, and when they get through let the other men work their half of the hour, without stopping the plant?"

We did that. We gave him the $10.00 with very much pleasure. At times we would change it and have a few of the men oil up parts of machinery, or do whatever immediate repairing was necessary to be done, shortly after they had their lunch. We find that has helped considerably in getting the men to think. They have had their minds on their work. We do not often hear one arguing about little things. We manage to call our men into the office at our plant, every once in a while, to get personally acquainted and talk over things, and get things better adjusted.

Around Christmas or New Year's we give them little gifts, such as a turkey or a goose. We try to be as personal with our men as we possibly can. If there are any complaints to make we have them come right up to the office and make their complaints to us. We don't have them beating around the bush. If we are wrong we admit it and we make it right. If the man is wrong we usually show him.

We are located about five miles outside the city limits of Beloit. We get the men together about once a year in a hotel and have a little banquet.

F. D. COPPOCK
Greenville Gravel Company,
Greenville, O.

I believe that the great army of employers in the country, regardless of the number of men they employ, and the nature of labor to be performed, will soon realize the necessity of greater industrial democracy. The absence of democratic ideas, the absence of personal consideration, the lack of contact and interest in the simple everyday affairs of the employed, the social distinction exacted by the employer, are labor's excuses for the lack of real interest in the affairs of the employer. It must be obvious therefore that the responsibility of the resulting dissatisfaction and unrest falls on the employer. It is natural that if we treat laborers as mere tools without any personal interest in their affairs, that they in turn will treat us as a machine, and without any personal interest in our affairs.

Did you ever stop to think how much we cater to bank officials in order to secure the use of $25,000 in money? At 6 per cent this money costs you the same per day as one laboring man. The laborer is just as essential to your operation as the money. This is one way to determine the value of labor.

An organization employing twenty men to carry on its operation should consider the securing and retention of this labor fully as important as the borrowing of $500,000, because that is exactly what the men are worth, measured by the fact that we pay the men for their labor as much as we pay for the use of the money. Believe me, we would palaver and cater to every member of a banking organization from the janitor to the president that would lend us this amount of money for use in a plant requiring only twenty men. We don't need to borrow $500,000 to run one of our plants, but we do need the twenty men; yet, how much consideration do we give them, how often do we go out of our way to accommodate them or to please them?

I am convinced that if it would be possible for employers in the gravel game and other industries to realize the importance of personal contact with their men, that they would decide this to be the cheapest and most effective method of avoiding labor troubles. Why not take a day off now and then for the purpose of looking over the operations and shake hands with these fellows, and why not make the common laborer feel that you have as much interest in him as you expect him to have in your business? Inasmuch as gravel operations do not require a large number of men, such a practice would require very little time; in fact, not as much as we devote to the cultivating of the banking bunch. How much more does one of these laborers prize a handshake with you and your solicitous inquiries as to his family than do those bankers! It is an easy matter to make a man yours for life by a little personal interest, and it is not necessary to renew a contract with him every ninety days as with the banker.

I think that we should inaugurate and encourage the practice on the part of our management, supervision and foremanship to become more interested in labor, and to systematically and religiously cultivate a friendlier and closer relationship to it; and my advice to employers who have not the time to personally give attention to this important phase of operation, would be to employ someone whose business it would be to carry to his labor his good wishes, to investigate their personal likes and dislikes, and learn something regarding the families of the men, to attend to their needs and comforts and to make them, through this evidence of real personal interest, closer to his organization, and to feel that "big family" loyalty.

The choosing of a foreman or superintendent is a very important thing. We should select men as nearly as possible who are considerate, reasonable and yet firm, men who reflect our ideas in dealing with labor. A common mistake is that of employing some husky double-fisted fellow as foreman, who feels that it is his duty to drive his men and to emphasize his position by being rough and dictatorial. The foreman, in dealing with labor, is your direct and constant representative, and we should tell him just how we want him to treat our men, and see to it that he carries out our policies.

Other than to encourage this personal interest by our management and supervision, we are doing a few things which we have found advantageous. At one of our plants we have a small hotel, enough to accommodate sixteen men, equipped with comfortable beds, bath and toilet, lounging and reading room, with plenty of good reading matter. Have a family to manage and look after the rooms, board the men and run a commissary. We have tried to furnish every conveniece to offset every excuse for their going to town. If we can keep these men from town, they are not so apt to be tempted by offers and bids from other employers. This bidding by employers has created a lot of discontent and turn-over in payrolls. At other plants we have trucks to haul the men to and from the work, charging the man an amount per trip to offset the upkeep of the machines. We have built houses at some of the plants which we rent to the most important of our men. We have encouraged and assisted others in the purchasing of their own property. We have never refused a man aid when he was sick, and have helped them to get all possible out of the Indemnity Insurance in case of accident.

I do not believe in profit-sharing with the laboring men in the commonly accepted interpretation of the term, inasmuch as in my opinion such a practice would have a tendency to give certain concerns a monopoly on labor because of patent rights, governmental protection, etc., which permit them to make out of their operation fabulous profits. Profits are not equal in all lines of business, even where the same number of men are employed. Profits are not the same at one gravel plant as at another, and I think the profit-sharing practice would tend to make labor in general discontented — some would be well paid while others would not. I do not think the profits earned by the company should be a measure, as I do think a man should be paid proportionately who exerts an earnest effort and manifests an interest regardless of profits earned by the concern employing him.

We do this in the matter of profit-sharing: We employ plant managers on small salaries—small when you consider their position and ability—and then allow them a per cent of the net earnings on their operations. We do this in order to encourage their interest in profit-making. Managers interested in salaries only are too apt to want ideal equipment and arrangements regardless of the practical application of such investments. We charge to the individual account of the manager the invoice price of all material condemned in order to prevent them from loading beyond the capacity of their plants. We emphasize the importance of properly-made materials and good service and prove to them wherein these are of more importance than immediate profits.

Another thing which we do in order to encourage the personal interest of managers, salesmen and, in

fact, all that are connected with our general office work, is to sell to them on easy terms of settlement, some common stock in our company. A considerable amount of our common stock is held by active members of our organization.

As to the bonus plan. I think that a plan designed to allow a per cent of the total amount paid an employe during the year, possibly at Christmas time, or at the end of the year, would be the means of encouraging labor to stay with you, and would assist materially in preventing turnovers in labor, and would be looked upon by them as a gift and personal remembrance rather than an arbitrary sum to which they are entitled.

I have suggested that our company put into effect the following plan: The allowing of 5 per cent of regular pay for all employees, regardless of the rate paid, who are with us for one year, this bonus to be increased ratably for five years so that at the end of the fifth year of continuous employment, the employee would be given 20 per cent per year on the total of his regular pay, as a bonus. In other words, the $5.00 man would get at the end of the first year about $75.00, at the end of the second year, $150.00, and up to $300.00 at the end of the fifth year. Experienced men are worth much more than the inexperienced.

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R. SNODDY
Coon River Sand Company,
Des Moines, Iowa

The system I have been thinking of, though have not fully determined on, is this: In the first place I put up to our people, the matter of paying a certain amount per ton for the tonnage produced over a given amount. Now, I asked them, did they want that for each day separately, or by the week, or month, or by the season. They readily decided they wanted it on a season basis; because on the daily or monthly basis they might be encouraged to rush forward and do something very radical and have a big day today and then lay down tomorrow.

Then the question came up: Isn't it possible that these men will do things that will be very expensive in order to make a temporary increase in tonnage? So the plan that we have just about worked out is to pay so much per ton for all tonnage in excess of a set amount for the season; provided that at the end of the season there is a profit. If it should happen to be a lean year when there is no profit they would not come in for this excess. This excess is to apply to those who have been only half of the season with us, since the first of July. And those who have been there a number of years are to have their percentage increased according to the number of years they have been there. We have not quite worked it out in detail, but that is along the line we are figuring on.

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J. L. SHIELY
J. L. Shiely Company, St. Paul, Minn.

We have a plant which is unionized. Our superintendent handles our relations with the men entirely. We pay a bonus of 10 per cent on December 15th on all the men's earnings during the year. That is paid up to December 1st.

We reserve the right, when a man comes to work, whether to extend him a bonus or not. We leave that entirely to the superintendent. We do not give bonuses to men who do not stay over 30 days. We do not even agree to give it to him after he is there 30 days unless we feel he is the kind of man we want.

We also pay our superintendent a bonus on production. Our plant has been unionized and our superintendent has the men pretty well in hand. We have never had a business agent on our job, and we have made it very plain to the men that when he does come on the job our bonus plan is off.

# Nebraska Producers

## Big Percentage Attended Annual Meeting in Lincoln

ON January 23, the Nebraska Mineral Aggregate Association held its annual meeting at the Lincoln Hotel, Lincoln, Neb. It was one of the largest attended and best meetings of its kind ever held in Nebraska, nearly all producers being represented.

The meeting was called to order by the Chairman, Mr. R. C. Yant, and in his very able and forcible manner he gave a hurried history of what great results the Association had accomplished and the possibilities confronting it for future work.

The questions of insurance, service, equipment, rates, specifications, standard tests and other matters were all taken up and discussed and acted upon.

Mr. H. F. Curtis spoke on the question of car service. Mr. Farrens addressed the members on specifications, and Mr. Glatfelter on working in harmony with engineers toward securing specifications. Mr. Thos. Sullivan spoke on sizing of aggregates. Mr. Wm. Keithley then told of the tests made by eastern and western experts using Nebraska material and showed our sand and stone are among the best in the country.

Mr. Fairchild gave a resume of conditions in the middle west and showed how organization was necessary to better conditions. Mr. Schellberg spoke on the importance of working with our National Association.

Mr. Allen gave an extended talk on why the producers should work in conjunction with engineers, architects, contractors and all trade associations, and brought out very forcibly the fact that as 65 per cent of the railroad traffic is carried on by the transportation of construction material these trade associations should be given the same consideration by the railroads in their appeal for open top cars as the mine operators are given.

The following officers were elected: R. C. Yant, president; A. H. Farrens, vice-president; C. E. Walsh, secretary; Thos. Sullivan, treasurer.

# Iowa Expects to Produce 2,000,000 Tons

THE Iowa Sand and Gravel Producers Association held its annual convention at Hotel Savery in Des Moines, February 4 and 5.

It was a most harmonious gathering with an attendance representing about 90 per cent of the tonnage of the state, a total of over 1,500,000 tons of sand and gravel for the past year.

The Iowa producers feel that they have done well in the face of the car shortage, and are predicting an output of over 2,000,000 tons for the present year.

Dwight Lewis, chairman of the Iowa railway commission, who addressed the association, said that although the commission was doing everything in its power to relieve the car shortage, he was unable to predict an early amelioration of conditions.

The association went on record with a resolution favoring the return of railroads to private ownership at the earliest opportunity.

The following officers were elected for next year: President, R. C. Fletcher, Des Moines; vice president, George H. Boynton, Muscatine; secretary-treasurer, Gaylord E. Gray, Des Moines. The latter takes the place of Clifford V. Ray, and is connected with the Des Moines Sand and Fuel Company.

Pit and Quarry

Rand-McNally Bldg., Chicago, Ill.
*Published Monthly*

HARRY W. BAUMGARTNER
Publisher
V. E. LARSEN, Manager

E. S. HANSON, Editor
D. J. HAUER, Associate Editor

## Closer Together

THE time is ripe for us all to begin to work toward getting all producers of mineral aggregates to hold their national conventions at the same time and place in 1921.

This thought was freely expressed in the ante-rooms of the two big conventions just closed.

There are so many things on which they might work together, so few to keep them apart.

They could have separate sessions if they chose, with a big joint banquet, or some such arrangement.

Are you for it?
Yes, so are we!

## "Opinion of the Engineer"

THE most hopeless specification is the one which is overloaded with the above phrase.

If, for instance, it is left up to the opinion of the engineer whether a certain gravel is equal to a stone of a given French coefficient, there is little opportunity for the producer to determine beforehand what the result is to be.

It is up to the engineer to determine a great many things; but as few of them as possible should be subject to determination on "opinion.'

## What Are the Facts?

THE accumulation of definite facts on the transportation question, as advocated by Mr. Ben Stone before the Indiana sand and gravel producers and by Mr. P. C. Hodges before the National Crushed Stone Association, cannot be urged too strongly. The man who fights the mineral aggregates' battles from this time forward must be fortified with all the data available. General claims as to inalienable rights, or general protests against so-called wrongs, will not get us far.

What are the facts?

Get them. Tabulate them. Analyze them. Get at the moral which they point. Then we can make some progress.

But to do this requires that every producer go over his records and get out the information which is to help win justice and fair play for everyone. Don't hesitate when asked to do this. It is a small price to pay for industrial liberty and justice.

## Options

IT IS NOT possible for a producer to have options on all the unworked deposits in his locality; but if he has any influence in the matter at all he may be able at least to get these options into the hands of worthy competitors. An Ohio producer was recently offered a price on such property, the owner thinking to speed up the sale by saying that So-and-So was after an option on it. "Fine!" said the producer, "let him have it. He is a member of our association and I know his business methods. Any competition he gives me will be clean and open, and will not disregard the cost of production nor the cost of doing business. You have set my mind at rest. I was afraid one of these cut-throat fellows might get that property."

## Have You a Specialty?

THIS office is often asked where special products can be secured —products which are more than "just sand" or "crushed stone." For instance, a recent letter asks for a source of supply of brown pebbles for use in stucco work.

So it would be well if our readers who are producing specialties of any kind would list these with us. This information will be kept on file in this office, in as carefully indexed form as possible, so that we can in this way be of service in bringing producer and consumer together in a number of cases.

What is your specialty?

## Ballast

PRODUCERS of crushed stone at the Louisville convention acknowledged to each other that railroad ballast is nearly always sold at too low a price.

And more than ever they are inclined to ask why.

Why should the railroads set the price on the material they use, while to other users the price is made by the producer, based on actual costs?

They should not!

Many of the stone men see this more clearly than they ever did before, as a result of the convention round tables.

Will they have the courage to act on their convictions?

## Season Contracts

SOME of the state secretaries have done well to call to the attention of their members the one-sidedness of a contract price for the season. One of them says:

In some of the larger markets of the state, where dealers are a factor in distribution, producers have been asked to make a contract price to cover an approximation of the season's tonnage requirements. Every one knows that such contracts are of no value. They merely give the purchaser an option to take whatever quantity of material he may want at a price fixed as maximum for the year. All obligations rest upon the seller. He must furnish requirements, be they greater or less than the quantity estimated at the time of making the contract, thus making it impossible to balance sales with potential production. Other disadvantages are obvious. Under present conditions, there is no reasonable argument in favor of such an arrangement. All quotations should be for immediate acceptance and subject to change if shipments are not ordered within a given time, except where specific work is involved, when quotations should be limited to a reasonable time after award of contract. Sales contracts should not be made except to cover deliveries of materials to be used on specific work.

## Help the Survey to Help You

THE task of the Geological Survey in collecting the statistics of the production of sand and gravel in the United States, is said to have proven very difficult. The small dealers not infrequently are reluctant to give the quantity and value of their output, and many of the new producers do not realize the purpose of the Survey's work.

This reluctance to furnish complete or satisfactory information is often due to the desire of the producer to keep all knowledge of his business from his competitors. He does not realize that the statistics of any particular individual or firm are held in strict confidence by the Survey and are not given out except by his special permission.

The small independent producer should use every legitimate effort to foster his own enterprise, especially when he is surrounded by competitors, but it is to his interest that he and his business be known to the Survey, which may be able to turn more business his way.

# Stone Men Had Three Days of Helpful Discussion

A CONVENTION is naturally expected to be a clearing house for information. That is what it is for—a clearing house, plus the delights of acquaintanceship and cheer which develop when good fellows get together.

But a convention is usually a deliberative body, more or less, where a member addresses the chair, is recognized, and allowed the floor for a space of time, and sits down again.

As opposed to this, the National Crushed Stone Association demonstrated at Louisville that it can hold a convention of the informal, free speaking, family group type, and still get abundance of good out of it—the information, the fellowship, and the satisfaction which comes when every member has a chance to "have his say" without restraint.

For that is the kind of a convention it was, for the most part. There was no printed program, to call the members back from their excursions into cost accounting, or the price of ballast, and remind them of the passing of time.

Sometimes the president and secretary knew at the beginning of a session what was coming up, and possibly sometimes they did not; but at any rate they were on the job to see that the discussion did not degenerate into mere gossip or wander too far afield. For at such times as it showed untoward symptoms, the gavel of the president or the loud "Now, boys!" of the secretary brought it back to the subject of stone and the best means to prosper in the crusher business.

There were two written papers presented at the convention—one of them on standardization of stone sizes and the other on electric drive. Both of these are presented practically in full on others pages of this issue.

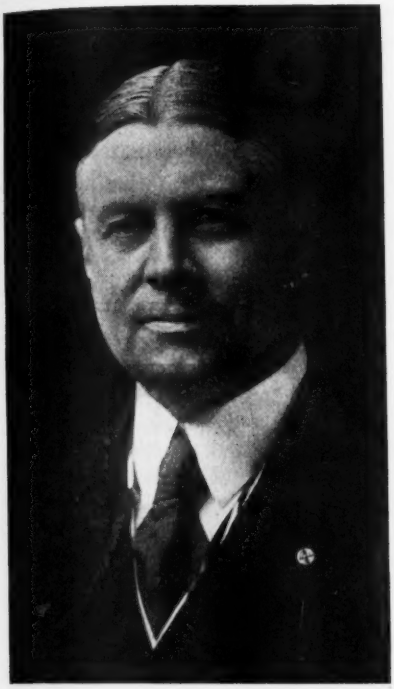
In addition to these there were carefully prepared talks presented by Mr. C. R. Wagner, of the National Agricultural Limestone Association, and Prof. E. O. Fippin, of the National Lime Association.

Mr. Wagner presented in a forceful way the development and commercial advantages of the production of agricultural limestone. He also was present throughout all of the sessions and conducted the group conferences on Tuesday and Wednesday mornings on agricultural limestone.

Several of these conferences were held on various topics during the convention, one of the most important being that on ballast, presided over by Mr. John Rice. At these conferences a very strong feeling developed that the ballast business should stand on its own merits and pay its own way, rather than being used as a sort of filler and allowing the railroads to dictate the prices.

Professor Fippin in his address made a plea for a closer co-operation between the producers of agricultural lime and ground limestone. He suggested at least four points on which they might agree: First, on standard definitions; second, the bigness of the field, with possibilities of an annual output of 20,000,000 to 25,000,000 tons; third, the education of farmers in the use of lime in some form; and fourth, a recognition of the fact that there is much research and experiment to be made before all is known that should be known about the use of lime in agriculture.

Of course, the railroad situation came in for a fair share of discussion.



B. D. PIERCE, JR.
First Vice-President

At almost the very beginning of the convention it was pointed out by Secretary A. P. Sandles, that other industries had obtained cars especially built for their purposes and crushed stone men must work for some such arrangement for their product.

The importance of the industry was stressed by Mr. Sandles, who said that a business in which millions of dollars are represented and one which is closely related to home building, road building, bridge building, the steel industries and agriculture, is in position to demand reasonable concessions from railroads.

And that started the ball rolling. The man who showed altogether the best grasp of the situation, the greatest appreciation of the work to be done and the method of doing it, was P. C. Hodges, of the Marble Cliff Quarries Company, Columbus, Ohio, who has had wide experience in handling traffic matters for his company. So it was not to be wondered at that, when the smoke cleared away, Hodges found himself at the head of a traffic committee, with power to appoint his assistants, to work with a similar committee from the National Association of Sand and Gravel Producers, if such a plan of co-operation could be effected.

Mr. Hodges urged upon the convention the necessity of getting as complete and detailed data as possible on the freight movements of the industry, and the amounts paid for same, together with the securing of competent legal counsel to assist in preparing this matter and presenting it before the proper authorities. He warned the members that to get results would mean hard work, co-operation, and the expenditure of a considerable sum of money; but he promised that if taken up properly and carried through, the results would be worth much more than the cost.

E. J. KRAUSE
Second Vice-President

ALLEN PATTERSON
Lima, Ohio

J. J. Urschel, of the Woodville Lime Products Company, Toledo, Ohio, presented charts in his report on cost-keeping, showing the detailed system used in his plant. After considerable discussion it was decided to instruct the executive committee of the Association to devise and send out for tabulation of the 1919 costs a blank which will divide the cost of producing crushed stone into seven main divisions as follows: (1) Depreciation and depletion; (2) General administration, including selling; (3) Labor, (4) Fuel; (5) Explosives; (6) All other materials; (7) Total. It was decided to have all operators make a uniform charge of 10 cents per ton for depletion of quarry and depreciation of plant and buildings.

An interesting event of the first evening was the exhibition of moving picture films by Mr. W. Scott Eames, manager of the New Haven Trap Rock Company, New Haven, Connecticut. These films were made in his quarry and showed some of the big shots made there and the handling of the material afterward.

Officers for the association were elected as follows: President, John Rice, Easton, Pa.; first vice-president, B. D. Pierce, Jr., New Haven, Conn.; second vice-president, E. J. Krause, St. Louis.

A. J. Blair, of Milwaukee, retiring president, was elected to the board of directors and the following members were re-elected: W. W. Boxley, Roanoke, Va.; Thomas McCroskey, Knoxville, Tenn.; W. Scott Eames, New Haven, Conn.; Dwight C. Woodbridge, Duluth, Minn.; R. B. Tyler, Louisville; A. A. Hall, Piqua, O.

John Rice, the newly elected president, is president of the General Crushed Stone Company, with main offices at Easton, Pa. This company is at present operating nine plants,

L. H. HAWBLITZ
President Ohio Macadam Association

and during its existence operated some four or five others which were for one reason or another abandoned. At the present time the company is shipping into the states of Maine, New Hampshire, Vermont, Massachusetts, New York, New Jersey, Delaware, Maryland, Pennsylvania and Ohio.

Mr. Rice graduated from Sheffield Scientific School of Yale University in 1885 and was for four years thereafter in the engineering department of the Philadelphia Bridge Works. For the next twelve years he practiced engineering and general contracting. In 1899 the Lehigh Valley Railroad concluded to ballast that road from Buffalo, N. Y., to Newark, N. J., and a company, under the name of the Duerr Contracting Co., was organized to carry out this contract, the name having been changed in 1901 to The General Crushed Stone Co. Mr. Rice was originally the general superintendent, afterward vice-president, and subsequently president.

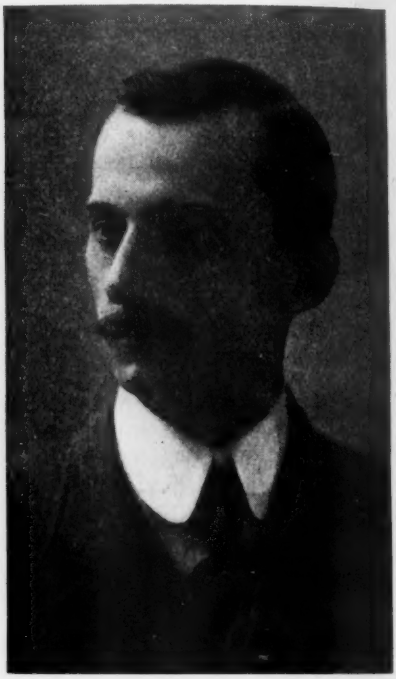
F. W. CONNELL
Secretary Indiana Crushed Stone Association

P. C. HODGES
Chairman of Traffic Committee

Resolutions were passed recommending a return to the macadam type of road with 12 inches of crushed stone, in view of the high cost of so-called permanent types of roads; one asking the president, congress and railway officials to give the stone industry fair treatment in the matter of car service; one asking for the return of the railways to private management on March 1, according to the President's proclamation, and one in the form of a letter to the Interstate Commerce Commission, asking it to consider the present status of the stone industry in the matter of railway rates.

During the dinner on the second evening of the convention the fellows "sang their heads off" under the leadership of Curtis C. Lattimer, one of

R. BRINK TYLER
Genial Louisville Host



J. F. SCHROEDER
Davenport, Iowa

the county engineers of Ohio whom the Buckeye delegation had brought along.

After the coffee had been served the "gas attack" began and lasted far into the night.

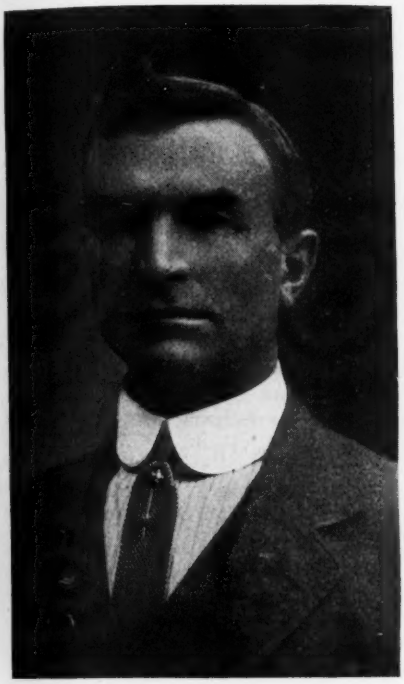
A. P. Sandles, secretary of the Association, presided as toastmaster. After eulogizing Abraham Lincoln, Mr. Sandles called on the gathering to join in singing "Nearer My God to Thee," and the guests then stood in silence for a minute as a tribute to Lincoln's memory.

The speakers were of one mind in declaring that a high-class system of highways throughout the United States is absolutely necessary to insure the future welfare of this country.

Many also urged the construction of highways to connect with the trunk lines of Canada as a means of furthering intercourse between the two countries.

Several members of the Canadian delegation spoke briefly. All were warmly greeted, and when F. C. Biggs, minister of public works for the province of Ontario, spoke of Canada as having been busy during the past four years "putting the Hun where he belongs," and added, "Thank Heaven, America was in there doing her share," his auditors rose to their feet, and broke into cheers that lasted for nearly a minute.

Among the other speakers were J. A. Duchastel, S. L. Squires, Fred Ellis, of Boston; A. J. Blair, retiring president; John Rice, of Easton, Pa., the newly-elected president of the Association; W. W. Boxley, Colonel Ritchie, U. S. A., and George P. Coleman, president of the American Road Builders' Association.



C. R. WAGNER
Exponent of "Agstone"

As a convention host R. Brink Tyler, of Louisville, did all and more than could be expected. He was on the job every minute of the time, looking after the welfare and comfort of the men from out of town and doing all in his power to make their stay in Louisville pleasant and profitable.

Much wonderment had been expressed among stone men throughout the country whether, in view of the present enforcement of the prohibition amendment, Mr. Tyler would be able to make good on a promise which he made to the convention last year in Buffalo. However, it need not be set down here whether he "produced the goods" or not. Those who were in Louisville know, and those who were not there can find out all about it by asking some one who attended the convention.

In recognition of his work, Mr. Tyler was presented on the last day of the convention with a handsome diamond pin.

The next meeting of the National Crushed Stone Association will probably be held in Toronto, Canada, but the matter was left open, to be decided definitely by the executive committee, the time and place to be the same, if possible, as the next meeting of the American Road Builders Association.

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An option on 120 acres near Garretson, S. D., has been secured by the W. G. Wright Company, of Minneapolis. The company will operate a quarry and stone crushing business on a large scale, it being reported that they will at once install a stone crusher with a capacity of 20 carloads of crushed rock per day. A sidetrack for their use will be constructed by the Great Northern Railroad. Their reported capital is $500,000, and it is estimated that their monthly payroll at the beginning will be $20,000 to $30,000. The increased demand for crushed rock for street paving operations throughout the state is a great impetus to the business.

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The Arizona Gypsum transacted a deal of considerable importance in the purchase of a 20-acre tract on the Tempe Road, adjoining the new packing house plant now being erected. The name of the place will be Gypsum and the product will be gypsum for fertilizer and building blocks and plaster. The building will begin at once. It was announced the company has enough money to insure the enterprise a success.

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The Iron City Sand Company, Pittsburgh, Pa., at the annual meeting of its stockholders, elected the following officers: President, Harry G. Pfeil; vice-president, Philip M. Pfeil, Jr.; secretary and treasurer, Howard G. Owens. Joseph A. E. Hoeveler was appointed sales manager.

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The White Haven Sand & Stone Company, Pittston, Pa., has been incorporated by George J. Miller with a capital stock of $100,000.

## Pulled Jay Gould's Special Train

### Gravel Man Told Convention Some of His Experiences as Locomotive Engineer

ONE of the interesting figures at the recent Chicago convention was W. S. Keller, of the Empire Sand and Materials Company, Eddyville, Iowa.

Keller was formerly a locomotive engineer, and the talk about unions, and industrial relations generally, put him in a reminiscent mood.

"I remember one time of having the pleasure—and it was a pleasure—of pulling Jay Gould's special train," said Keller. "I never met a more common 'old shoe' than Jay. I remember on that trip when we stopped at one place he came over and gave me a cigar and I said 'Thank you, I will smoke this after while.' He said, 'Smoke it now.' I told him it was against the rules to smoke in passenger service. 'You are not in the passenger service,' Gould told me, 'you are pulling a lot of dead heads who don't pay a cent.'

"Then he said if I didn't mind he would ride with me for a while and see how my engine was running.

"I said to him, 'Have you a pass? I can't carry you on this engine without a pass.' He said, 'No, I don't believe I have.' I said, 'It will be necessary for you to have one, Mr. Gould; that is the rule here.' 'Well,' he said, 'That's a good idea; I'll just hop off and get one.'

"The other officials were along, and there was no trouble for him to get the pass."

## Hough Resigns From Lime Association

### After Six Years of Service He Will Enter the Business Field

THE resignation is announced of Norman G. Hough as secretary of the National Lime Association. The announcement is made by Charles Warner, president of the Association, as follows:

It is with deep regret that I have to announce the resignation of Norman G. Hough as secretary and head of the Construction Department of our Association, to take effect on February 29th.

Mr. Hough has served our national association honestly and industriously for nearly six years. Throughout these many years of service it is gratifying to look back on the excellent and harmonious work of such a man. From beginning to end the relations of Mr. Hough and all of our various staff members and officials have been most harmonious and agreeable. He leaves us with deep regret and sincerest feelings of regard on all sides.

It is quite unfortunate for our Association that Mr. Hough has found a larger and better business opportunity elsewhere than our Association is in position to offer. We shall régret the loss of his counsel in the conferences of our Staff Committee and we feel certain that all the members of the lime industry will join us in following with appreciative interest his development in his new work.

The secretarial and other duties performed by Mr. Hough are being temporarily realigned in consultation with the special committee on staff and office organization, authorized by our Board of Directors, which committee meets within a week. We will work out the necessary plans for continuing all of these duties without interruption and we trust that the new plans will meet with the entire satisfaction of our members.

# Prices Increased in Louisville

### Several Producers Tell Our Correspondent Why This Was Done

It is a peculiar and interesting fact that a slight increase in the price of sand and gravel has proven the sensational feature of the structural material situation during the past month in Louisville, Ky. Sand and gravel prices were advanced 30 cents on the yard, which is a small advance considering that there was no advance during the past year, but when this advance was announced effective February 15th it figuratively raised more "sand" than anything which has happened among all the advances in structural materials for a year. This is due partly to the fact that some one receiving notice of the advance made a kick to the local papers and it was played up as if two important local rivers and concerns had practically doubled the price of sand and gravel.

The actual increase and the present prices are as follows: Washed sand has been increased from $1.05 at the hopper to a present price of $1.35 per cubic yard; and gravel from $1.15 to $1.45. These are hopper prices and the delivered prices have the hauling cost added which varies from 40 to 75 cents per yard depending upon the distance. For example, delivered prices in the nearest zone to the yards has been raised from $1.40 to $1.75 on sand and from $1.50 to $1.85 on gravel.

Car lot shipments are sold by the ton unit and these have been advanced approximately 15 cents a ton. Sand which formerly sold at 85 cents is now $1.00, and gravel which sold at 75 cents is now 90 cents per ton F. O. B. cars.

Specified inch gravel for local delivery, which has been used quite extensively for the past year or more in reinforced structural work, is 40 cents a ton higher than straight run gravel. This is because in filling orders for specified inch all the gravel above one inch must be screened out, crushed and rescreened, thus adding to its cost. At that, however, the price compares favorably with crushed stone, for local prices on crushed stone are $1.25 a yard for road rock two inches and under at the quarries.

John M. Settle of the Ohio River Sand Co. explained that the increased price was essential because of the increased cost of labor and fuel supplies and equipment which enter into the digging, screening and elevating of river sand and gravel.

Capt. E. T. Slider, head of the E. T. Slider Co., which has a yard on this side of the river and also a yard on the New Albany side, and operates the jumbo digger of the Ohio, went into extensive explanation of the situation in efforts to put the matter clearly before the local papers to relieve the misunderstanding and settle the furor which has been created.

He explained that they got out a very elaborate printed list in book form and the old list was gotten out five or six years ago, giving the prices net. From time to time certain advances over the old list have been made and contractors notified of them and the latest advance, though it was only 30 cents, made the total of advances since the old list was printed 85 cents. Some interpreted this to mean that prices had recently increased 85 per cent whereas the 85-cent increase really covers a period of five or six years and the new increase is only a matter of about 25 per cent.

Capt. Slider compiled statistics to show very conclusively that sand and gravel as compared to pre-war prices has advanced less in proportion than any other structural material for some of the others have doubled and quadrupled, lumber notably, is showing increases ranging over 300 per cent.

Notwithstanding the furor created through the newspaper notoriety and the misinterpretation of this price advance the local sand people say that business is of better volume now than it ever has been this early in the season and the winter business as a whole has been of such unusual volume that they will be pretty well cleaned out of stock on the yards before they are ready to start the spring digging in the river again.

J. E. Lloyd, in charge of the Louisville branch of the E. T. Slider Co., says they will have their piles pretty well cleaned out before they are ready to start their digger again which is now undergoing the regular alterations and repairs.

# For the Good of the Sand and Gravel Industry

THERE were two high spots at the recent Chicago convention of the National Association of Sand and Gravel Producers, two points which bid fair to become a part of the permanent history of the industry. At least, so it would appear in looking back upon the convention from the distance of a few days only, to most of those who were in attendance.

One of these high spots was purely an organization matter, while the other will perhaps affect the industry more broadly in that it has to do with some of the more vital and human relationships of life. The first was a matter of the relation of one producer with another, the second that of the producer with his employes. The first was the report of the so-called "Committee of Ten," otherwise known as the Committee on General Policy; the second was the discussion—both formal and informal—on the topic of "Industrial Relations." This latter is given almost entire in another part of this issue.

The Committee of Ten was appointed at the beginning of the afternoon session of the first day, following the spirited discussion during a large part of the forenoon on the general policy and activities of the organization. In fact, the association expressed itself so fully at that time that when the committee brought in its report on Thursday afternoon, expecting that it would precipitate an extended debate, it was surprised to find that it had anticipated the desires of the convention almost exactly, and the report was adopted with very little discussion.

The committee was made up of one member each from the various state and district associations holding membership in the National Association, with the following personnel:

John Prince, of the Stewart Sand Co., Kansas City, Mo.

M. D. Schaff, Virginia Timber Co., Springfield, Ill.

Floyd Goodrich, Humboldt Gravel & Tile Co., Humboldt, Ia.

J. H. Allen, Lincoln Sand & Gravel Co., Lincoln, Nebr.

G. J. Nettkemper, Terre Haute, Ind.

Guy C. Baker, The Greenville Gravel Co., Greenville, Ohio.

C. N. Ray, United Fuel & Supply Co., Detroit, Mich.

A. W. Dann, Keystone Sand & Supply Co., Pittsburgh, Pa.

Milton McDermott, Knoxville Sand & Transportation Co., Knoxville, Tenn.

Chas. L. Ruffin, Massoponax Sand & Gravel Corp., Fredericksburg, Va.

The report presented by the committee was as follows:

Your committee, appointed for the purpose of giving consideration to and recommending the general policies for the guidance of the Association for the coming year, beg to report as follows:

First—That a committee of state or district secretaries, of which the business manager of the National Association shall be chairman, be established and be composed of the secretaries of organized state or district associations. This committee shall meet quarterly, or at such other times as they may be called by the chairman. The functions of this committee shall be to give consideration to the methods of conducting the affairs of the state associations. They shall make recommendations to the executive committee through the business manager of the National Association as to its work and policies. The expenses of the members of this committee shall be met by their respective state and district associations.

V. O. JOHNSON
President Lincoln Sand and Gravel Company,
Lincoln, Ill.

Mr. Johnson was born in Ohio 47 years ago. He graduated at Oberlin College in 1897 and in 1900 at the Law School of Western Reserve University at Cleveland, after which he practiced law seven years at Cleveland. In 1907 he became manager of the Lincoln Sand & Gravel Company, and in 1914 its president. Also president of Sabula Sand & Gravel Company, Sabula, Iowa, and Barry Sand & Gravel Company, Barry, Ill. Has been active in Association work, both State and National. Is a republican by birth, a Congregationalist by adoption and a farmer by choice. Has been too busy to acquire a hobby, but has a very satisfactory wife, three daughters and a son who live at Oberlin, Ohio, and enjoy a visit from "Dad" whenever he can tear himself away from the sand and gravel business.

In assuming the duties of president of the National Association, he hopes to see the membership approach the 100 per cent mark set by the membership committee. He appreciates the great influence which such a body of "live wires" can exert and the benefits to be gained by them when acting through an organization. He looks forward to a day when gondolas or open-top cars will not be called or considered "coal cars." And he also expects the Association to convince the rate-making powers, when next increases are considered, that "We have had ours."

The Locomotive
OF
CHICAGO

Little Giant
Road Crane
economy and economy, coupled with a wide
of work render the LITTLE GIANT ROAD
CRANE incomparable for the quarryman or
producer.
to tell you how a LITTLE GIANT ROAD
CRANE will make money for you
Crane Company
AMERICA
ILLINOIS

Second—That the executive committee be requested to immediately make effective the advisory committee provided for in Art. 4, Sec. 5, of the constitution.

Third—That a committee be appointed by the president of the National Association to consider the necessary revisions to the constitution of the National Association and to make written notice of any proposed changes to the business manager of the Association 30 days previous to the next annual convention of the association.

Fourth—That the executive committee of the Association consider the advisability of moving the offices from Indianapolis to Chicago, when, in their judgment, the necessary funds are available and the best interests of the Association will be conserved thereby.

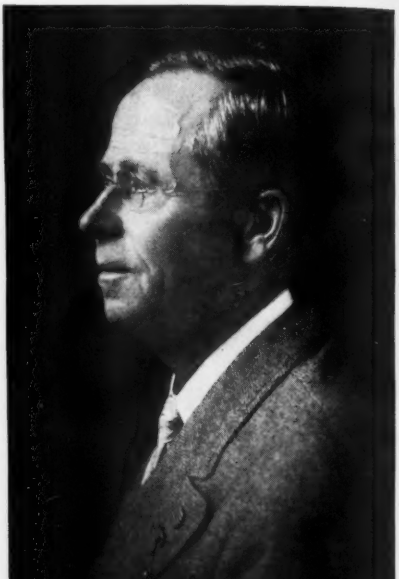
Fifth—That the primary activity of the Association for this coming year shall be an active campaign for members through the existing state and district associations and by the active encouragement of the organization of additional state and district associations.

Sixth—That the Association continue and increase its activities in its effort to secure equitable distribution of open-top cars to the industry from the existing supply and that the railroads be constantly urged to increase the supply of open-top cars for the use of this industry.

Seventh—That a special committee be appointed to co-operate with other mineral aggregates associations to prevent further unreasonable increases in the rates on mineral aggregates and secure and disseminate through the business manager's office and the secretary's committee, all information available concerning rate activities throughout the country.

Eighth—That the National Association co-operate actively with all associations or organized bodies and Government departments in extending and establishing the best practices as to the use of sand and gravel.

Ninth—That it will be necessary in order to conduct the activities herein outlined that the Association have available funds to the amount of $25,000 for the activities of the Association, and $5,000 in addition thereto for the activities of the committee on rates, making a total of $30,000 as the minimum amount required for these activities.



HORATIO S. EARLE

Genesee Gravel Co., Detroit, Mich.

Tenth—That in order to secure the funds for the Association to be obtained from assessment in a business-like manner, that the payments during any year be based on the production in tons of the previous calendar year, and that these payments be made in four equal parts, payable quarterly, beginning March first of each year.

Eleventh—That in order to secure the funds necessary to meet proposed budget of $30,000 above specified, that the activities outlined may be fully carried out to the benefit of all members, the rate of assessment based on the known production of members for 1919 should be and your committee herewith recommend: That the minimum dues remain $25.00 per year; that for the first 200,000 tons of production the rate of assessment be 2 mills per ton; that for the second 200,000 tons of production the rate of assessment be 1¼ mills per ton; that

for the third 200,000 tons of production the rate of assessment be ¾ mills per ton; that there be no assessment in excess of a production of 600,000, making the maximum assessment $800 per year. That the provision of Art. 7, Sec. 4, providing for a discount of 25 per cent from regularly organized state and district associations, be not changed.

Twelfth — That your committee make the foregoing recommendations after careful and thoughtful consideration thereof and submit them, believing the same to be for the best interests of the association.

It will be seen from this report that some radical steps were taken in the interest both of the state associations and the National Association. The budget of $30,000 was voted without dissension, showing that the members of the Association are heartily in sympathy with the work and are willing to put up the money to carry it on.

The relationship with the railroads has been a big topic in almost every convention of mineral aggregate producers for the past two or three years; but this Association has apparently worn itself out on this subject, as the discussion concerning the railroads was not as spirited as on some other lines. The secretary, Mr. E. Guy Sutton, devoted a large part of his report to the railroad situation, not only as to the past activities in this regard, but with respect to the future of the railroads themselves and the effect of this situation on the sand and gravel industry.

With respect to the future Mr. Sutton said:

Railroad legislation, while still pending, is taking tangible form, yet it will not be out of place at this time to venture opinion as to what the future holds with reference to freight rates. One thing is certain: The inequalities brought about by General Order No. 28 will remain in effect until changed by competent authority, for the bills passed by the House and Senate, respectively, each make such provision. Both the Esch and the Cummins bills encourage, if not actually require, the filing of petitions by the railroads for rate increases.

Furthermore, regardless of additional authority, the railroads have the privilege under existing law to file schedules of rate changes with the Interstate Commerce Commission at any time, and that they are proposing to do, as already announced by the Association of Railroad Executives, immediately following the termination of federal control, so that there is no doubt but that an increase will be sought. The petitioners most likely will ask for a percentage increase in order to facilitate the handling of the application. The amount, of course, is entirely speculative, though it will probably be from 25 to 40 per cent.

If a general percentage increase is proposed on sand and gravel, the matter at once becomes a national issue. If rate groupings are formed, as contemplated by the provisions of the Cummins bill, and which feature of the proposed legislation has practically been agreed upon by the conference committee, the rates of each group will be established so as to earn at least the minimum return guaranteed by the measure. It is possible, but not likely, that rate advances in some groups will not be necessary to provide the guaranteed return. (Incidentally, this provision will result in lack of stability of rates, since they will be subject to change from time to time as the Interstate Commerce Commission may direct, for it will be impracticable for anyone to say just what rates will yield the required revenue necessary to meet the guarantee; so if rates are either too high or too low, adjustments must be made.) It may be assumed, however, that broad, general principles will be fixed by the Interstate Commerce Commission to conform to the rule of rate making prescribed which will be applied in the determination of rates for each group. Moreover, we may conclude that the Interstate Commerce Commission will design and put in operation a definite method for arriving at a rate structure covering any given commodity. Assuming that these predictions are correct, it will be necessary to gather and assemble reliable data as a basis

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for establishing what the sand and gravel traffic should bear in comparison with other commodities, and to substantiate any claims that may be made as to the injustice of proposed advances. This information should be collected and tabulated by the national association with the assistance of state organizations, under the advice and direction of a traffic attorney of recognized ability, and held ready for use as the occasion may demand. In this connection it must be borne in mind that we will not now be dealing with a body of self-interested railway officials as opposed to an equally self-interested body of producers, but with the Interstate Commerce Commission, which will hear and render decision in judicial capacity upon the presentation of facts.

Just how far the national association may go in handling the rate proposition for the entire industry is a matter of development, but with the likelihood of the railroads asking for a blanket increase and acting as a unit, as they will through their national association, is it not logical to conclude that the question will have to be attacked in like manner by the sand and gravel shippers?

In other words, government operation of the railroads, good or bad as it may be in principle or in practice, is not the fundamental reason for the failure of the railroads to meet transportation requirements today. Neither is the labor feature of the problem, serious as it is, the underlying cause. The truth of the whole matter is simply that the transportation demands of the country have increased faster than the transportation facilities. Until this unbalanced relation can be adjusted, sand and gravel producers, as well as other shippers, must face and endure inadequate service from the railroads. How long it will take to bring about a proper adjustment is problematical. The very best that we may expect in the meantime is to receive the proportionate share of cars to which we are rightfully entitled.

Under the provisions of both the Esch and Cummins bills, the Interstate Commerce Commission will have authority to regulate the distribution of cars. This function will probably be administered through a car service section similar to that now in existence, the establishment of which has already been decided upon by the Association of Railway Executives. This means that the distribution and interchange of cars will be under the jurisdiction of a centralized body, and that shippers of a given commodity will look to that source for rules and

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regulations that will protect their interests.

While no doubt local officials will have more authority with reference to furnishing cars than they have had under federal management, yet they will be subject to the central agency. There will naturally arise a keen competition for cars between shippers of various commodities and especially will this be the case between the coal operators and the producers of mineral aggregates, as the former, through their well-financed organization, will employ their usual tactics in attempting to obtain preferential treatment. Is there any question as to the prudence of our national association being prepared to meet the situation?

Important as the freight rate question may be, it passes into comparative insignificance when we approach the matter of car supply. It would give me the greatest degree of satisfaction if I could with sincerity hold out to you a faint hope that conditions with respect to transportation service would be perceptibly better during 1920 than has been the case during the year that has just passed. You frequently hear it stated that as soon as the railroads are returned to private control the situation will be promptly improved. Be not deceived thereby!

The railroads, so far as operation is concerned, will be in the hands of the same officials after federal control is terminated that are running them now, though they will be paid by the corporations instead of the government. Then, too, the proposed guaranteed returns to the railroads will not stimulate constructive enterprise and efficiency in management any more than government ownership. The employees will not be a different set of men on March 1st than they were on February 29th. Their disposition or the nature of their demands will not be changed. New cars and additional locomotives will not spring up over night.

The only convention speaker on the railroad situation was Mr. A. G. Gutheim, of the Car Service Section of the United States Railroad Administration. He was introduced to the convention by Judge Swango, of Indiana, who characterized Gutheim as the savior of the gravel industry. Reviewing the inability of the association workers to get any satisfaction whatever in Washington until Mr. Gutheim was discovered, he described the meeting with this man as a case of "love at first sight," and said that

HOWARD B. HOEL
Greenville Gravel Co., Greenville, Ohio

every gravel operator in the United States who did business of any consequence in 1917 and 1918 owes it chiefly to this man of the Car Service Section. Mr. Gutheim talked for some little time in an off-hand, conversational way, winning the confidence and friendship of the convention, as he had won the committees on their frequent visits to Washington.

He said that starting in March 1st, the railroads will have to proceed very much by guess. He seemed to feel sure of one thing, however, and that is that they are going to make a determined effort to cut down expenses and get back to normal operating ratios, and at the same time give reasonable service. "They feel," he said, "that they are 'on their last lap of corporate ownership,' to quote the statement of one of the Interstate Commerce Commissioners, and that 'if they do not make good, they will not last.'" Continuing, he said:

Nevertheless, you have got two schools among the railroad men. The first school is the school that figures that his primary duty is to the stockholders, and that is really his only duty. Those men, I think, are going by. I believe that the railroad executives and the railroad operating men are learning the lesson that the railroad traffic men had to learn a number of years ago, and that is that you cannot run transportation in this country without regulation. That is entirely beside the mark as to whether that regulation is good, or bad, or indifferent. The fact is, the American people seem to believe in the regulation of commerce.

There is another school of railroad men who appreciate exactly what they are up against, that when they get back their properties and start operation they have to operate and produce a service for which the people are willing to pay money. Otherwise they will not get the revenue that will be big enough to bring the operating ratio down.

But both of those schools, in the last analysis, come down to the proposition that there is one thing more than anything else that is necessary from their standpoint, and that is that they must cut down expenses; and they have really committed themselves to cut down expenses by the criticism that has been made of governmental operation.

It is perfectly useless, I think, for a railroad man to talk about making money unless he has got something to sell that is satisfactory to the shippers. Somehow or other, some people seem to think that buying railroad service and selling railroad service is a little different from buying a suit of clothes and selling a suit of clothes. You go out and buy a suit of clothes, and it is the trademan's job to give you a suit that satisfies you. If you do not get a suit that satisfies you, you leave it and go somewhere else; but the general criticism of the railroads in the past has been that they gave you the service they could, and if it was not good, you could take it or leave it; but usually you had to

take it because there was no other person could give you the service.

My impression is, from my contact with railroad people generally, that the majority of them appreciate that they have to get out now and sell service that is satisfactory to the shippers. I believe that on that basis we are going into a time of competition among railroads that will overshadow any competition we have had for a good many years past.

The particular part of legislation with respect to service with which you gentlemen are concerned is that which pertains to your cars. As you know, we have had in the administration, and before that, under the Railroad War Board, an organization in Washington that took care of the handling of cars as between the railroads. That was its primary purpose. To a lesser extent it took care of the handling of the cars as between commodities and as between individuals.

The Railroad Administration took over that organization of the railroads bodily, personnel, files and everything, right into its organization, and the chances are that the railroads will take that same organization bodily, right way from the Administration, into the hands of the corporations, and keep it in Washington. In fact, that much is settled, and the Interstate Commerce Commission has an assurance to that effect from the proper executives of the corporations. Whether that body, functioning for the corporations, with the Interstate Commerce Commission as a sort of a foster father on the side, ready to do what is necessary if the railroads through that organization do not—whether it will have the same jurisdiction that the Administration organization now has, is a question.

Mr. Gutheim thought that cars were ownership, rather than pooling them, likely to be distributed on a basis of inasmuch as the cars are of different carrying capacities; and during the past four years some of the roads have not kept their cars up in the best condition, so that a "car for car" exchange does not protect a railroad with a heavy and well-kept equipment. He said that, in his opinion, there will continue for several years the agitation with respect to the preferential distribution of cars; but he felt that this would be cut down as much as possible, since preferential treatment for one industry simply causes a scarcity of cars and consequent distress somewhere else. While the legislation now pending gives the Interstate Commerce Commission the power, in emergencies, to change the equitable distribution of cars, to avoid all the car service rules and to set up new rules to take care of the situation, the speaker felt sure that the commission would look long and earnestly on any proposition of that sort before acquiescing in it.

GEORGE V. MILLER
President of Indiana Association

Mr. Gutheim declined to discuss the question of rates, as entirely out of his province.

Two resolutions on the railroad question were submitted by Mr. Sutton, and passed, as follows:

Whereas the shippers of sand and gravel have suffered irreparable loss under private operation of the railroads on account of the discrimination in practice by the railroads in the distribution of open top cars as

between coal mines and sand and gravel plants; and

Whereas this discriminatory practice has been allowed to continue during Federal control; and

Whereas the proposed legislation in both the Cummins and the Esch bills makes special mention and provision for the distribution of open top cars between coal mines during a period of car shortage; and

Whereas if such legislation is passed it will tend to perpetuate this discriminatory practice regardless of its intent.

Therefore be it resolved by the National Association of Sand and Gravel Producers in convention assembled that they do protest against the granting of special privileges to the shippers of any commodity, and

Be it further resolved that the establishment of rules and regulations designed to govern the distribution of open top cars used in interstate traffic be delegated solely to the Interstate Commerce Commission.

Be it further resolved that a copy of this resolution be sent to the members of Congress, both senators and representatives.

The second resolution was as follows:

Whereas the provision of the Esch Bill providing for the return of the railroads expressly provides and makes it mandatory for all railroads to demand a general rate increase within 60 days after their return; and

Whereas on June 25, 1918, by general Order No. 28, the commodities sand and gravel and crushed stone were given an increase in rates of over 50 per cent based on the actual earning bearing rates, while commodities in general received 25 per cent increase; and

Whereas these excessive rates were placed on the commodity to discourage its movement as a war necessity and that this necessity no longer exists,

Therefore be it resolved by the National Association of Sand and Gravel Producers in convention assembled that the aforesaid provision making an increase in rates mandatory be excluded from the final conference bill, and further that the commodities sand, gravel and crushed stone be excluded in any proposed raise in rates.

Specifications, tests, and standard sizing came in for a considerable amount of discussion. One of the principal speakers was Prof. T. R. Agg of Ames, Iowa, from whose address the following extracts are taken:

There can be no doubt that a standard method of designating sizing will be of advantage to all concerned; but I don't see that it makes a great deal of difference what the method of designation happens to be so long as it is one that is unmistakable. The committee of the Mississippi Valley Highway League, on which I had the pleasure of serving as chairman, have come to the conclusion that the easiest way out of that particular situation is to adopt the method of specifying that the materials shall pass a laboratory screen of a certain size, and shall be retained on a laboratory screen of a certain other size; but that in order to take care of inevitable variations in plant operation there shall be permitted a tolerance of such percentage of the maximum size, likewise a tolerance of another percentage on the minimum size.

Your problem, then, as producers, will be to determine in the case of your own plant equipment the relation between the size produced by your screens and the size produced by a standard laboratory screen, which will be easily done; and having once learned that factor it will be comparatively easy to prepare a material complying with the specification of that general character with very little chance for argument, or very little chance for difficulty in meeting a reasonable specification. It may be that further study along this line will evolve some method of specifying sizes that will be more suitable; but at the present time that seems to be the prevailing idea.

As to tolerance, that subject has been discussed pro and con at considerable length by various conventions of engineers during the past few months, and the trend seems to be in the general direction of a requirement of 15 per cent tolerance on the maximum size and 5 per cent on the minimum. That, however, is a matter that has not been finally adopted; and through the committee of which your business manager, Mr. Sutton, is a member, it is hoped to finally reach

an agreement by which this matter will be worked out and it is hoped to be able to propose a general scheme to the American Society and Committee.

Just at this point I should like to emphasize that there seems to have been an erroneous impression in regard to the trend of the study that has been made of mixtures of sand pebbles, or gravel, as we commonly call it. I find that the sentiment seems to be in many quarters that the whole trend of recent experiment is to the end that those materials may be used pit-run just as well as in any other way. That impression has arisen from the fact that experiments have shown that by suitable methods of proportioning you can make concrete from bank run gravel of any particular grading so long as it is clean; that it will be just as strong as concrete made from arbitrarily proportioned aggregates. That is considering only one factor of strength. In some cases that might be the logical thing to do; but on the other hand the factor of costs enters in and in most instances will be a controlling factor, and it will be impossible to produce concrete of a given strength with bank-run gravel as cheaply as it can be produced by arbitrarily proportioned materials, and get the same strength. Another factor has come up for consideration on the part of the engineers when dealing with this particular phase of the subject. If concrete is to be manufactured from aggregates of varying compositions, that means a variation in the proportioning to meet the variations in the aggregates; and such variations may be frequent, they may come many times a day on any particular piece of construction work, or they may come rather infrequently; but a serious problem of administration of contract work is involved and the difficulty of securing the class of inspection that will insure concrete of a uniform quality when manufactured from widely varying aggregates is one that is not easily solved. The tendency on the part of engineers who are responsible for large construction programs seems to be towards the use of aggregates that are arbitrarily divided into fine and coarse materials, and re-proportioned. This is primarily because it simplifies the problem of inspection and makes it easier to insure that there will be produced a concrete of uniform strength from day to day.

A specification should provide for the use of any suitable material commercially available in the locality.

The Association will during the present year make a determined effort to increase the membership. While no fault can be found with the way in which the membership has grown so far, it is recognized that there are many producers who are still out of the organization and who, for the good of all parties, should be brought into it. Retiring President Donnelly pointed out at the very opening of the convention that the association started in three years ago with 17 or 18 members, while at the time of the convention it had about 220. He said, however, that there was no reason why the membership should not be doubled during the present year.

Just before the close of the convention the newly elected president, V. O. Johnson, assuming the gavel for a brief period, gave voice to a similar sentiment, saying:

"I hope that we may be able to justify the faith that you have placed in us as officials and members of the executive board, and I shall consider that in a large measure our success will be determined by the number of members we are able to report a year from now. We ought to have a thousand members when we come back next year. If we don't have at least 500, you ought to say something to your president and the members of the executive committee and the membership committee."

The association has had a membership committee at work during the past several months, that committee being appointed by the executive committee at a special meeting held in Chicago last September. The chairman of this committee is W. P. Carmichael, of St. Louis.

# Some Experiences in Pumping Sand and Gravel

Extracts from a discussion before the Chicago Convention.

BY R. SNODDY
Coon River Sand Company, Des Moines, Iowa

IF YOU have as much as 5 per cent of boulders that will not go through your pump, it does not pay to try to operate with a pump more than 500 feet out; because every time you catch a boulder on your nozzle it shuts off your suction and you have to stop taking in sand, and, as we say around the plant, "kick the pipe clean," before you can drop that boulder that has obstructed your suction. So that when you have as much as 5 per cent of boulders that will not go through, it is not a safe or a practical proposition to undertake to operate for more than 500 feet out.

But for any place which is practically free of boulders, and for plants of less than 30 or 40 cars a day, I have never found anything that would be anywhere as economical as a pumping system.

I will admit that if a man wants to put out 90 or 100 cars a day, and he is going into a big steam shovel proposition, to load the stuff on his car and switch into his pit, he will do better than he could with a pump; but there are very few plants of that type, or rather very few plants with that amount of cars to get the stuff away from the plants. The most of us figure on around 20 to 40 cars a day, and that is the type of plant or capacity of plant to which the pump is very adaptable.

As to the capacity that can be obtained with a pump, we have not had but one case for several years when we had enough cars at one time to enable us to develop the fullest day's run at full capacity so that we might know what we could do. We loaded 56 cars that day. The scale weight of 52 of them showed an average of a little over 51 tons to the car, and the others showed an average of a little over 42 tons. This was 7 hours' continuous operation, picking the material up at an average of 20 to 25 feet below water and transporting it 600 feet through the pipe line and making a raise to 30 feet above water at the other end of the pipe line. We have made a good many runs of one car at a time that was at a larger rate per hour, but that is the only opportunity we ever had to do anything like a full day's run to see just what we could do.

On the river propositions we have two kinds of material, one river bed and the other wash-in. The wash-in stuff is easy picking, but the original river bed is usually glued down where you have to pound it and undermine it to make it cave in. If you have an original river bed proposition, send your nozzle out from your pump so that you can swing backwards into your deposit. Work at the bottom all the time. It takes a little more power to handle the stuff from 40 feet below water than it would only 20 feet below water, but it is not enough to counteract the advantage of working at the bottom of your deposit, because with just a small amount of excavating underneath your pile of material it will cave. Then you have a pile of soft, loose material from which to pump. When you press your nozzle up against your bank again you undermine it, and so on.

But after you have cleaned out your deposit in a river and the water goes up and the ice stirs up the bars ahead of you and fills your hole up again, you have to turn that system around and go the other way. You can't work from the bottom, because it will not stand up enough to give you any face to work in. It will erode in so that under water it won't stand more than about 35 degrees.

After the stuff has washed in off your bars above for two or three years, then it will quit coming because the larger boulders and larger gravel do not wash. Nothing but the smaller stuff washes, and after this is cleaned away you have the bottom of your river paved with boulders, with nothing else to come to you. Then you are up against a move. We have found that the average is about four years in one location for a plant that runs an average of 15 cars a day. The more cars per day you run the shorter time you can stay in one place. That is the reason we feel we are entitled to claim quite a lot of depreciation on our plants.

The general principle of pumping sand is just the same as pumping water. You are limited to the height you can raise material above water to your pump, and theoretically you are limited to something like about 32 feet. That is theoretical, but when it comes to actual pumping, don't undertake to go over 28 feet. Try to hold your suction gauge around about 25 or 26. Along in there is the safe point, because if you are running at 28 and should happen to catch a good sized boulder on your nozzle you choke off your inlet. Your suction will run up above your limit; and as a rule, before you can stop your pump or shut her off you have broken your suction and possibly your pipe line, or it settles. When it settles you have got about one chance in ten to kick it out. It is usually a case of uncoupling your pipe line and cleaning it out a piece at a time, so that it pays to work on a margin of safety. That margin of safety should be from 25 to 28 pounds to work on, and while you get more material working at higher pressure while working, yet you lose more time in the long run.

On your discharge end you are almost unlimited in a way. There is a certain distance to which you can go economically. Beyond that if your conditions require you to go further, put a booster in the line. If you are working electricity, your electric wires coming out to your boats along the line of your pipe line, which is carried on pontoon boats, your electricity stops at this first boat and connects up with that motor continuously right on to your other motor, and the other operator controls both motors although they may be 1,000 feet apart. Under ordinary conditions it will cost you about $500 more for that type of installation, but you can readily see that what you would have to pay for a man to operate the other motor would make up for the difference in a very short time. Once in a while you will have a circuit breaker kick out, or something of that kind, on the one where there is no operator. Then, of course, you are up against a shut-down until you go back there and take care of that; but if you watch it and keep the breaker at the motor where the man is operating so that it will trip before the other one, you will never have that trouble. of course, where you are operating a steam or a gas engine you can't do that. When operating with a motor it is advisable to use the variable-speed motor and operate it 90 per cent of its normal speed. You are using a little more current while you are running than you would if you were running at full capacity, but you will save time in the long run, because when you get an overload in your pipe

you have a reserve. It will save a good deal of time in not having to lift your nozzle, the inlet to your pipe line, to get rid of an overload in your pump.

In handling your material after you have pumped it to the place you want it, drop it just as quickly as you can. Every foot that you go up with it is costing horse power, and if your average for all day's pumping is 5 per cent of solid you are going some. It is true that for a few minutes' time you might pour out of your spout 20 per cent of solids, but you will not average that. If you average 5 per cent solids you are doing pretty good pumping. You can figure that up. When a man puts 56 cars through a pump with 10-inch lines, with the flow about 12 feet per second, you can figure out quite a few million pounds that he is handling there in 7 hours' time.

After you have got the material into your plant, the thing that seems to bother most people is the question of de-watering it, so that you can handle it. There are several systems. The one that we have used most is to throw it onto a flat screen, as we call it, set at a 45 degree angle. Wire cloth is used generally, with ¼ or $\frac{3}{16}$ mesh, or if they will allow us to cut the gravel down to ⅛ inch we are glad to to do it. From the screen the gravel goes into a hopper. It is then picked up by a bucket elevator and put down on revolving screens for sizing. After being finished it is then elevated on a belt conveyer up to storage bins. The sand and water which go through the first flat screen drop into a sump, which is made by driving pile and boarding up, or it can be done by concreting, and at the far end of this sump is an outlet through a pipe that leads back to the lake or river, and about 5 feet from the end you have a doorway which you close by adding a plank across the bottom. After the sand accumulates to the point where it is about to run out of the bins, you drop another plank in; and when it is filled up another 6 inches and about ready to run over you put another plank in. Your water and dirt flow over the top all the time. After your bed is full you switch the flow of material over to your other sump, and within 10 or 15 minutes' time you can take the sand out of this first sump with a clam shell. Another system frequently used is either a chain or a belt elevator, where your material, instead of being deposited in a large sump where the water is taken off, is deposited in a small sump. The water is kept with it for the reason that it is easier for the buckets to take it and the material is then elevated with these buckets up to storage bins.

Some people use a stiff-leg derrick and make the sump bins in a circle, but it doesn't give as good washing. On plants where you have been using drag-line excavators, as soon as you have worked out everything within radius, you can then stick in your pump outfit and pump over to the place where your drag-line can pick up, right to the top of your bins, and go right ahead with the operations just as you did before that, only you have materially increased your capacity for the reason that your drag-line has but a short distance to go. When you are going to do that there should be a pocket or pond left where the material you pump can be discharged direct from your pump line; and by having no overhead, that is, no elevation in your pipe line, it will require very little power to send it a long ways. The greatest distance I have had experience with in pumping that way was about 2,000 feet, and in the 2,000 feet we did not require as much

power as we did for 600 feet to elevate up to a 35-foot elevation above water. The greatest distance I have had experience with in pumping to the bins where we were using the material was an 1,800-foot pipe line from the nozzle to the discharge, with an elevation of 30 feet at the end of the line; and in 9 hours we put up 28 carloads with an average of about 45 tons to the car. But it required a tremendous amount of horsepower.

There are a great many little things in regard to a pumping proposition that almost any one would know offhand. In the first place your suction line must be absolutely air tight. Get your pump just as close down to the water as you can. If you are operating off a barge, put your pump down in the hull of the barge in one corner of your boat, with your suction line sticking outside of your boat and get to your material in the shortest space possible from your pump. The part that cuts down on the efficiency of your suction is the part above water. The part below water, as is argued by some, doesn't count. It doesn't count so far as weight is concerned, but it does count for friction and for speed.

Your pump should have just as few elbows as possible. The power necessary to turn a 90 degree elbow is equal to the same power as would carry about 15 feet on a straight line.

The difference in the size of your pipe line makes slight variations. The larger the pipeline the less friction you have. There are some people who take a 10-inch pump and put a 12-inch pipeline on. It is true you cut down your friction for a given amount of water in a certain length of time, but when you increase the size of your pipe line for the same amount of water you slow down your speed, which will cause it to carry a less volume of material, and the fact is that the most of the material that is carried is dragging on your pipe and eating it up. The smaller your pipe the more of a spiral effect the water has in going through it. That keeps your material suspended in the water so that you don't wear out your pipe very much.

## Tells Amount of Sand in Ohio River

### Wheeling Man Says It Would Build 45,000 Miles of Road

CITY Engineer Harry Conrad of Wheeling, W. Va., has compiled facts and figures to prove that 273 miles of the Ohio river contains a sufficient deposit of sand and gravel to build 45,000 miles of concrete road 18 feet wide, 6 inches thick on the sides and 8 inches in the center. This would include an 18-foot border highway of 8,000 miles around the United States; 10 transcontinental boulevards across continent at intervals of 120 miles; four routes across country from north to south, intervals of 800 miles with 1,000 miles left over for patch work. This same sand and gravel would build two highways 16 feet wide around the world or connect the north and south pole four times and do other small jobs.

The engineer arrived at his conclusion from the following data:

Average width of sand and gravel bars 300 feet.

Average depth of sand and gravel bars 10 feet.

Assuming that 50 per cent of the length of the river bed is productive there would be a yield of sand and pebbles of 80,080,000 cubic yards which would furnish sufficient material for 45,000 miles of 18-foot road.

# Portland Cement in 1919

## Large Increase in Production and Shipments

PRELIMINARY estimates compiled by the United States Geological Survey, Department of the Interior, indicate that the production and shipments of Portland cement in 1919 increased 13 and 21 per cent, respectively, over those in 1918 and that the stocks decreased 52 per cent, so that at the end of 1919 less than 5,000,000 barrels of Portland cement was in stock at the mills. The Portland cement industry was set back considerably in 1918, when war restrictions reduced the shipments from the 90,703,474 barrels shipped in 1917 to 70,915,508 barrels, but it is now regaining its lost ground. Early in 1919 the business was even poorer than in 1918, and practically all the increase reported was made during the latter part of 1919, so that 1920 started with favorable prospects for the cement industry. During 1919 the shipments from some mills were limited by the lack of freight cars. The increase in the value of the cement shipped in 1919 over that shipped in 1918 was about 28 per cent.

The shipments of Portland cement in 1919 amounted to 85,485,000 barrels, valued at $144,461,000; the production amounted to 80,287,000 barrels; and the stocks at the mills at the end of the year amounted to 4,976,000 barrels.

One new plant produced Portland cement in 1919—the Indiana Portland Cement Co., at Greencastle, Ind. The total number of plants that produced cement in 1919 was 110, and the total number of plants that shipped cement was 113. The average factory price per barrel for Portland cement in bulk in individual States in 1919 ranged from $1.57 in Kansas to $2.03 in Utah. The average factory price for the whole country in 1919 was $1.69, an increase of only 6 per cent over 1918.

The exports of hydraulic cement from the United States in 1919 amounted to 2,463,689 barrels, valued at $7,516,019, or $3.05 per barrel, increases of about 9.27 and 16 per cent, respectively, over 1918.

# Big Buildings for Buffalo

## Opening of Spring Will See Some Work Requiring Much Material

OWING to the long and severe winter and the vast snowfall, the building trade is very near at a standstill in Buffalo, and concerns dealing in sand, gravel, cement and kindred products allied with the building business, are resting on their oars and waiting for spring, when they hope to see things open up.

Some promise of this is given with at least three large plants due to be built here with the coming of building weather. The Dunlop Tire Corporation of England has notified the Buffalo Chamber of Commerce that it has selected this city for one of its plants. This will be erected on River Road and an idea of its size is gained from the knowledge that it will employ about 5,000 men when completed. Another large plant to go up on River Road is that of the Pennsylvania Rubber Company.

The Buffalo Steel Car Company will erect a big plant in Walden avenue and the Wickwire people have also secured a site for a Buffalo plant, to be erected this spring.

It is figured that this building of large plants will bring many people to this city, many of them entire new families, if building keeps pace with

the demand and relieves the present acute housing situation.

Hopes are based upon all these things by the Buffalo Gravel Corporation, the principal corporation of that nature in the city. D. Hyman is president of this corporation and R. W. Eberly is general manager. In an interview for PIT AND QUARRY, President Hyman reviewed the above-mentioned conditions here at present. Continuing, he said:

"Owing to adverse weather conditions, the building trade here is practically at a stop at present, even to repairs, with the exception of strictly indoors work.

"We view the spring trade with very much concern, owing to labor conditions even more than to the high cost of materials. Labor cost is both high and scarce, and labor is really the backbone of any building construction as well as a big factor in the matter of encouraging building.

"I understand two or three large concerns have completed plans for the building of large factories here. They will start with the opening of spring and will probably go rather slowly, feeling their way, owing to costs along all lines—labor, material, etc.

"We are, however, in great hopes that business will open up, due to the fact that during the war and since, few new buildings were erected in Buffalo. Buffalo, for its population, for its location and for its rail and water facilities, is far behind other cities which have not the natural advantages Buffalo possesses.

"I believe it to be only a matter of time when Buffalo will come into its own in this regard, as it is justly entitled to do and am looking ahead for a start in the right direction this spring. Whether these hopes will materialize or not, I am, of course, unable at present to predict."

# Gets 'Em Coming and Going

## Stone Producer Does Stripping With Two Buckets on Endless Rope

A KENTUCKY stone producer has developed a rather unusual excavator for removing his overburden. This consists of a dragline scraper arrangement using two scrapers instead of one.

The equipment is described as follows in a recent issue of *Leschen's Hercules*, published by A. Leschen & Sons Rope Company, St. Louis:

"The scrapers themselves, of which the are two, are just plain ⅜-inch steel pans with fixed and sloping rear end, and are shod with ½-inch and 2-inch shoes to take the wear. Other details of this system consist of a dumping mast, a hoisting engine and a sufficient length of Leschen wire rope to connect up the scrapers, mast and engine.

"The rope is endless and as the loaded bucket moves towards the mast, the empty returns for another load. The loading crew consists of five men. Forty loads an hour is fair work in average material.

"The overburden consists of various materials. When soapstone is encountered, it has to be shot up, and when a ledge of undesirable stone is encountered, grab hooks are substituted for scraper and the work goes merrily on.

"The stripping width at any one position of the mast is about 80 feet. When this area is stripped all of the system, except the scrapers proper, can be put to quarry use, so there is practically no idle equipment at this plant."

# Standard Commercial Sizes of Crushed Stone

A paper given before the Louisville Convention of the National Crushed Stone Association

BY FRANK H. JACKSON

Senior Assistant Testing Engineer, U. S. Bureau of Public Roads

I AM not going to waste any time in rehearsing the arguments in favor of a standard system of stone sizes. You are just as familiar with them as I; and, moreover, many of you can undoubtedly call to mind incidences where the lack of such a system has cost you both time and money. Suffice it to say, that although the question has been discussed in a more or less spasmodic fashion for some time, it has only been within the last year that we have really gotten it under way, and we are not going to stop until we have secured the general adoption of a practical and simple series of standard stone sizes. Then, too, the increasing demand for crushed stone with which to construct roads called for under the 1920 program will surely result in a shortage of this material unless strenuous steps are taken to increase production, and I know of no better way to increase production than for engineers and producers to get together and decide on the *minimum* number of commercial grades required for legitimate needs —draw definite specifications for each grade worded so clearly that there will be no question as to just what is meant and, above all, make these specifications practical from the standpoint of the commercial production of the material. It has been my experience that this latter point has been often overlooked in drawing up specifications. An engineer will specify a very closely graded product which meets his particular fancy without a thought as to whether such a product can be economically produced. I have in mind a specification in which a grade of pea stone is required all to pass a ½-inch screen and to have not more than 5 per cent pass a ¼-inch screen. How many plants could produce such a materal economically? It is by the elimination of such impractical requirements as these, as well as by making such sizes as we do specify as open as is consistent with good practice, that we can best aid in increasing production. I can see therefore a very real and practical benefit to be derived from early action on this subject.

Now just a word about what has already been done along this line. During the summer of 1917 the U. S. Bureau of Public Roads commenced a field survey of current practice covering the production of crushed stone in the New England and Middle Atlantic States. Some 100 commercial quarries were studied and data was collected for use in connection with this subject. This survey was continued during the next year in Ohio, as well as in some of the southern states. The information obtained is very interesting in showing the bearing which the various factors influencing the production of crushed stone have on the grading of the final product. The data obtained has been published in "Public Roads," the monthly magazine of the Bureau of Public Roads. The typical specifications of the Bureau which were issued shortly after contain specifications for crushed stone sizes adopted as a result of this survey. Since this time, a number of States have adopted these specifications. During the summer of 1919, the Association of Mississippi Valley State High-

way Department appointed a committee to look into the question of commercial sizes of crushed stone for use in these states, Prof. T. R. Agg, of the Iowa State College, being appointed chairman, while on November 18, under the auspices of the Pennsylvania State Highway Department, engineers and producers from New York, New Jersey, Pennsylvania, Delaware and Maryland, met in Philadelphia to talk over the question as applied to these states. The American Society of Testing Materials committee on Commercial Grades of Broken Stone and Broken Slag, which I represent, was formed last fall. This is the first organization which has attempted to consider the question from a national standpoint. It is exceedingly fortunate in having on its membership both Prof. Agg and Mr. Mattimore as it hopes in this way to co-ordinate the work of the organizations just mentioned. The committee also felt that the stone producers should be represented and steps have been taken to bring this about. The committee has held one meeting at which several of the difficulties involved were discussed and some conclusions reached.

The first question to engage the attention of the committee was the proper method of specifying stone sizes. As you know, there are two general methods in use at the present time. One of these uses the actual grading of the stone determined by mechanical analysis as the basis of the specification, while in the other the diameter of perforations in the plant screens over which and through which the material passes is used to designate the sizes desired. It was the sense of the committee that the latter method which has been used recently in a number of state specifications is unsatisfactory as well as misleading on account of the numerous factors which influence the efficiency of the revolving screen. It is true that a number of these factors, such as speed and pitch of screens, are fairly uniform. Even in plants, however, which apparently have been well designed, the tendency has been to install screen sections of only sufficient length and diameter to take care of the average output of the crushers rather than the maximum which may be delivered at intermittent intervals. This fact has undoubtedly a great deal to do with the lack of uniformity in grading of successive shipments from a given plant of nominally the same grade. Until we can be assured, therefore, that all screening plants will be designed and operated to secure the maximum efficiency possible, the committee feels that it would be best to specify size requirements on the basis of actual size of product as determined by mechanical analysis. Then, too, a standard system of sizes designed to cover the entire country and including products of widely different physical characteristics and consequently obtained by entirely different screening methods, can not hope to adequately limit the sizes required by specifying the character of the screening operation. We feel that the standardization of methods of producing stone should be left to the producers and that it can and will be accomplished by them if the actual sizes required have once been determined by engineers.

The argument has been advanced that producers must be told just what sizes of screens to install in their plants. It seems to us that such an argument is a reflection on the intelligence of the producers. It stands to reason that the average operator of a large permanent plant is much better qualified by reason of his familiarity with local conditions to determine the screen installation best suited to produce a given product.

Another point discussed by the committee was the question of tolerance to be allowed in specifications. This is a point on which we would like to have the ideas of the producers. In general, the committee believes that experience as well as results of numerous actual tests have shown that the maximum efficiency of revolving screen can not be put at over 85 to 90 per cent; that is, it is unfair to require that more than this proportion of the grade required shall actually lie between the sizes specified. Furthermore, we all know that in order to produce even this 85 to 90 per cent efficiency it is necessary to install revolving screen sections with perforations slightly larger in diameter than the perforations in the laboratory screens with which the product is to be analyzed. For instance, if we specify that a certain grade of stone be between ¾ and 1¼ inches in size and that 85 per cent of a sample of this product must actually lie between these sizes when analyzed with laboratory screens, the operator knows that he must install screens with perforations somewhat larger than the sizes required. Just how much larger is a matter for each producer to work out for himself and will depend upon the efficiency of his plant and the character of the stone he is crushing.

The matter of nomenclature was also discussed. We feel that this is important simply as a matter of standardization. It does not make much difference what we call a product provided everyone calls it by the same name. As a matter of fact, the numbering of sizes is open to serious objection, due to possible confusion with the numerous numbered systems in present use.

As a result of its work to date, the committee has prepared a tentative series of standard sizes of crushed stone for use in road construction and in concrete. We propose that commercial plants be ordinarily equipped to turn out five elementary sizes of stone, these sizes to be as follows: Fine screenings, of that portion of the product of the crusher passing a ¼-inch laboratory screen; chips, or dustless screenings, that product of the crusher between ¼ and ¾-inch in size; 1 inch stone, the product of the crusher between ¾ and 1¼ inches in size; 2-inch stone, that portion between 1¼ and 2½ inches in size; and 3-inch stone, that portion between 2½ and 3 inches in size. Furthermore, at least 85 per cent of each size to actually lie between the limits specified.

It is felt that practically every standard type of road in which crushed stone is used can be built with these sizes. For instance 0 to ¼-inch size could be used for any one of the various purposes for which fine screenings are adapted; the ¼ to ¾-inch, or ½-inch stone can be used for carpet coating waterbound macadam roads or as fine chips in the bituminous macadam type. The ¾ to 1¼-inch size is suitable for use as an intermediate or chinking course in bituminous macadam, the 1¼ to 2½-inch size in either waterbound or bituminous macadam wearing course, and 2½ to 3½-inch size in the base course.

Various combinations of these sizes will suggest themselves as follows: A mixture of the two finer sizes may be used as coarse screenings for waterbound macadam road construction. A mixture of ½ and 1-inch stone is suitable for bituminous concrete wearing course, binder course in sheet asphalt or in reinforced concrete; and a combination of either the ½, 1 and 2-inch, or the 1 and 2-inch size, as desired, for concrete road construction. Most of these sizes it will be noted conform very nearly to present general practice.

The committee is well aware that just as good roads can and have been built using differently graded stone. It is felt, however, that satisfactory results could be obtained using the sizes here suggested. Moreover, if adopted by all parties concerned they would have the very great advantage of being standard, thus doing away with the endless confusion and misunderstanding so common in the past.

It is the intention of the committee to send in the very near future to each producer of crushed stone in the United States, as well as to all of the State Highway Departments, a suggested series of standard sizes worked out along the above lines, together with methods of specifying and tolerances to be allowed.

## Prince Talks About Costs

### Interesting Facts, Especially As Applying to Floating Equipment

ONE of the topics which came up before the convention of National Association of the Sand and Gravel Producers was that of cost reports and the method of making such reports. One of the men who gave a considerable amount of information on this subject from his local association was John Prince, of Kansas City, Mo. Mr. Prince said in part:

"In the Missouri and Kansas Association we are now reporting our costs monthly to our secretary on regular forms submitted for the purpose. Not only that, but the secretary, who is an accountant as well, is assisting producers in making valuations of their property in order that proper charges for depreciation, obsolescence and exhaustion may enter into their costs, and monthly the total average of all the plants in the district will be returned to each producer, so that monthly and again annually every producer in the district will know the average cost of production in the district.

"Not only that, but there are one or two little interesting items of cost of production which have come up in our district. The most of our production is from rivers with floating equipment. Our producers found that it was practically impossible to secure insurance against marine hazard, marine risks, fire or any other hazard, on their floating equipment. That was called to their attention in connection with a discussion of costs and the relation of costs to price. No one in the district was charging anything for insurance on that floating equipment. We made a rather hurried analysis among a few of us there and we found out that in the history of four years with six plants the average cost to the producer amounted to 20 per cent per annum on the value of the floating equipment in that district — a very large item of expense, for which no charge had been made except as the losses occurred, the producer makng only a small allowance for 'occupation loss,' which I think is what the insurance people call it.

"I believe we are now working in the direction, at least, to see if we can organize a mutual insurance association, whereby that cost can be charged off and made a part of our operating cost acceptable to the internal revenue department in our state.

"In our association we also report daily from all our producers all acceptances, that is, orders accepted and the price at which they are accepted, and all shipments made and the price at which they are shipped. That information, again, is returned to the producers, tabulated in uniform shape, but not with the individual sales."

# TISCO MANGA

## The Producer

of stone, sand, gravel knows that the urgent work of th- coming season will not admit of delays. He will have to be in a position of security if he hopes to meet the demand for aggregates for roads, buildings and other classes of construction. This year is expected to bring a harvest to producers of these three widely used materials, and those who will get ready for the rush will reap the benefits.

## How Prepare?

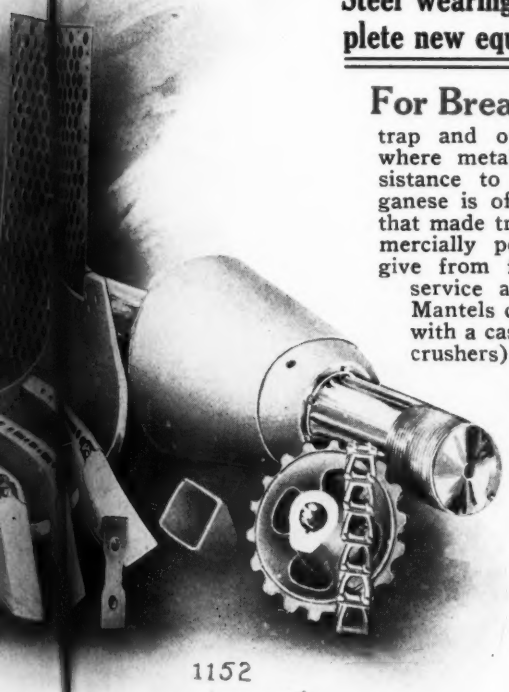
Can it be done by using odds and ends you may pick up from time to time as needed? Emphatically "No"! That is a makeshift method, unworthy of a good business man. Only by preparing your plants to last the longest possible time, enabling them to take care of orders promptly as they come in, can you cash in on a heyday of business to the fullest extent. You may think you have new machinery that will certainly take care of you against others who have repaired older equipment, but that is a "yes" and "no" proposition. Yes—if you specified on your order that the wearing parts of your various new equipment be furnished of TISCO Manganese Steel; No—if you have specified other wearing materials.

In the illustration is shown a ste... dip... reversible dipper teeth for a 2½-yard ... Simi... steam shovel parts of manganese are ... for ... dippers. The manganese crusher part... inc... crusher head, concaves or staves, and ... for

# TAYLOR-WHARTON IRON &

# ANESE STEEL

***A repair job* with TISCO Manganese Steel wearing parts is better than a complete new equipment with other materials.**




own a steam shovel dipper front equipped with Panama a 2½-yard ... Similar fronts and teeth with other anese are also ... for any and all makes and types of usher parts ... include a jaw plate, screen plate, staves, and ... for rotary pulverizer.

## For Breaking Granite

trap and other very hard and tough rock where metal of toughness, strength and resistance to wear is required, TISCO Manganese is of first importance. It is the steel that made trap and granite rock crushing commercially possible. TISCO Manganese will give from four to six times the length of service as the same part in chilled iron. Mantels can be made smooth or corrugated, with a cast iron center (or solid, if for small crushers) and of any design the customer desires. Jaw plates for some crushers are carried in stock, others made up upon receipt of customer's orders.

Screen plates made of TISCO Manganese have many advantages. They wear many times longer than punched plates, due to their holes tapering from a given diameter on the inside to a larger one on the outside, by which means the screen is kept clean of stone and the holes do not tend to elongate.

Preparation for this coming busy season should include the policy of ordering manganese steel wearing parts for parts subjected to excessive wear and hard usage. If you adopt this policy, you will avoid shutdowns due to breakage or worn parts, keep the plant running, and turn out the dollars.

## We Can Take Care of You

TISCO has provided ways and means of taking care of the increased demand for all kinds of wearing parts for crushing machinery, screens, conveyor chain, sprockets and buckets; lips, fronts, Panama reversible dipper teeth, etc., for steam shovels; hammers for pulverizers of any standard make.

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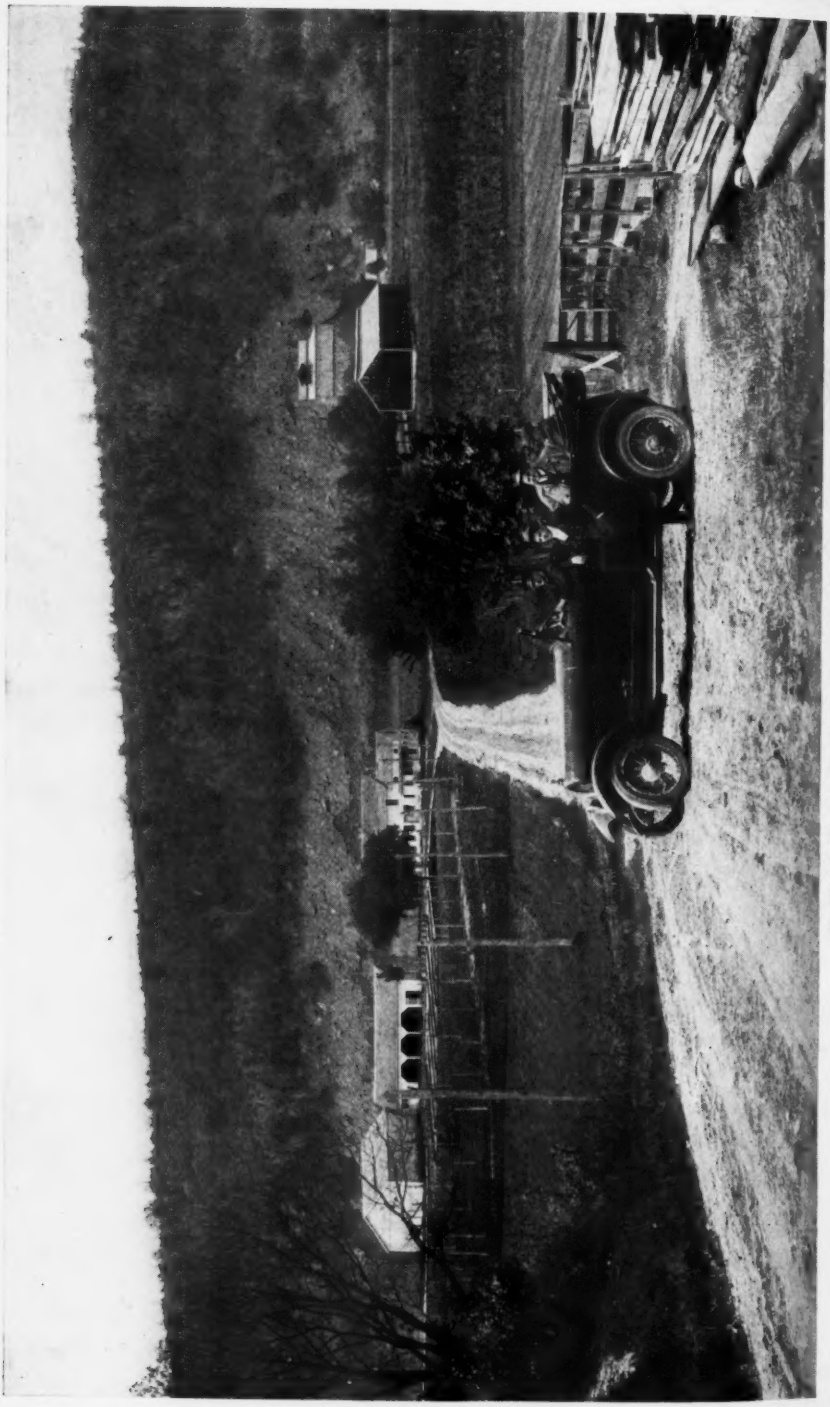
wearing

# RON & STEEL COMPANY HIGH BRIDGE, NEW JERSEY



Plant of Berlin-Suffield Trap Rock Company

# Big Trap Rock Quarry

## Connecticut Company Has Attractive Location at Manituck Mountain

THE Suffield-Berlin Trap Rock Company has a plant location in Connecticut which might be described as romantic. This company has its office in Hartford, and regarding the plant the treasurer, J. L. Warner, writes:

We recently completed this plant and it is one of the largest trap rock quarries in the country. The property is known as "Manituck Mountain" and contains about 300 acres. It is situated in the towns of East Granby and West Suffield, Conn.

This quarry is equipped with the latest machinery. We have at this plant a new gearless crusher for making fine stone, and this crusher will make 70 tons an hour of ¾-inch, ½-inch and screenings. We also have a large No. 30 gyratory crusher which has a capacity of 5,000 tons of 2-inch and down in ten hours. We have two large steam shovels working there which eliminates much of the hand picking.

There is an unusual amount of loose stone at this plant and it is all nice, clean, blue, hard stone. We have had New York engineers estimate that there is about 5,000,000 tons of loose stone at this plant for which we will not have to use any dynamite at all.

Plant of Berlin-Suffield Trap Rock Company

# Gypsum Deposit in Florida

The only deposit of gypsum south of Virginia and east of Mississippi river is in a swamp in central Florida. It has been known for many years but remains to-day undeveloped, although it lies in a populous part of the country and is several hundred miles from any other deposit. It is the soft earthy variety of gypsum known as gypsite and could be used for application to agricultural land, particularly on peanut crops, and also for making wall plaster, plaster boards, and building blocks.

The deposit is small, the available quantity probably being not more than 200,000 tons. It could be mined by steam shovel or floating dredge and delivered to the railroad near Panasoffkee by a 4-mile haul. No one, however, has yet undertaken to develop this deposit because of its small size and its location in a swamp and because the Florida market for gypsum products is easily supplied by gypsum producers in Virginia and by producers in the Atlantic Coast States using gypsum from Nova Scotia.

# Here's Your Bag, Mr. Donnelly

## Take It (and Contents) with the Association's Regards, and Come Again

AT the close of the luncheon on the last day of the sand and gravel convention, retiring President Donnelly was called onto the floor and presented a handsome traveling bag by President Johnson, in recognition of his three years of service.

Mr. Donnelly proved to be very retiring, so overcome was he by the suddenness of it all; and still more so when J. L. Shiely opened up the bag and began to present the contents—article by article, as John Prince would put it in reading the report of the Committee of Ten.

First there was the dollar bill which Mr. Donnelly himself had contributed to the pot, thinking at the time he was paying for his luncheon. Then there was——

But why go into details, when white paper is so valuable?

Suffice it to say that everything in the bag can be used by a traveler at one time or another, and Mr. Donnelly has promised to show his appreciation by getting the entire contents into service as soon as possible. And he says the associtaion will have the opportunity of seeing the bag once a year at least.

# Almost a Famine in New York

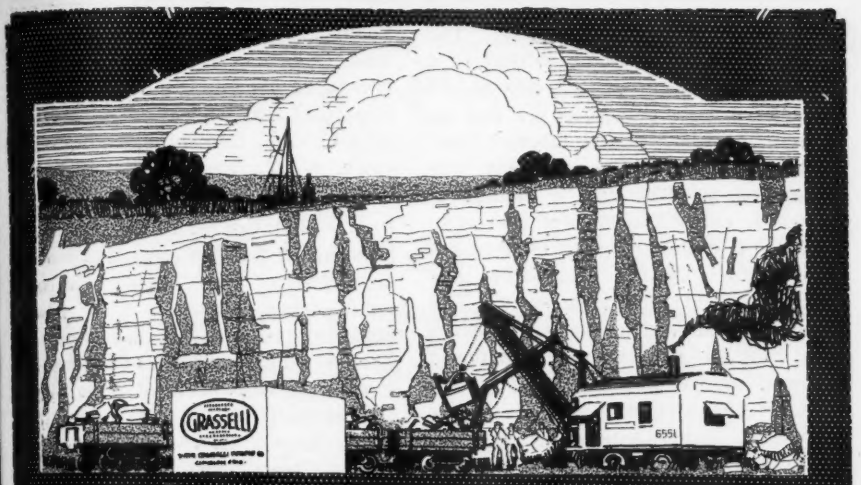
## Sand Ballast From Europe Practically Only Supply on the Market

SAND, gravel, grit and crushed stone are leading features in the New York market, for the scarcity of these commodities is bringing about unprecedented conditions. The heavy call for these products in the past months for building and other construction operations, coupled with severe winter weather has reduced the available supply to a very low point—so low that it might almost be stated that a famine exists. Practically the only building sand in the market is that brought over to this country from Europe in ships returning light. With this situation prices have advanced to higher levels, and the end in this respect does not seem in sight; some of the producers are sold well up in the spring, and others are having no trouble in turning advance orders for this season. Crushed stone in wholesale lots is quoted at $1.75 per cubic yard, 1½-inch size, and $1.85 per cubic yard for ¾-inch stock; dealers are asking $3.50 per yard for the material delivered on the job. Clean white sand is now quoted by the dealers at $4.50 a cubic yard, while a good grade of standard building sand is selling through the same channel at $2.50 a cubic yard, delivered on the job. In the matter of wholesale, or cargo lot distribution, the material is quoted at $1.25 to $1.50 a yard. Gravel is bringing a price of $2.00 per cubic yard in carload lots, both for 1½ and ¾-inch sizes, while dealers are asking $3.50 for good washed gravel delivered on the job. Portland cement holds at $3.40 a barrel, delivered, but the tendency is for an advance in this figure. The building stone market is following the trend of the sand and gravel situation, with orders being placed for material well in advance of delivery. Limestone is selling at from $1.25 to $1.35 per cubic foot, while sandstone is bringing from $1.00 to $1.50 per cubic foot. North River bluestone is quoted at $1.05 a cubic foot.

The Rockland & Rockport Lime Co., of Maine, has filed authorization to operate in New York under a capitalization of $2,552,500. E. B. Page, 101 Park Avenue, is local representative. The company has recently disposed of its property at Morgan, Meserole and Montrose Avenues, Brooklyn, to the Grasselli Chemical Co., Cleveland, Ohio, for a consideration of about $170,000. The site aggregates 120,000 square feet, and has been used for shipping and distribution purposes.

The heavy snow and severe winter weather in northern New York has brought about reduced operations among the sand and gravel producers in this district. The pits are frozen and the quarries unworkable, and with the heavy call for material milder weather is looked forward to with keen anticipation so that work can be resumed at a fair status. Among the new companies to be formed in this section are the Apex Grit, Sand & Gravel Co., Buffalo, operating with a nominal capital of $5,000 and headed by W. Knight, D. J. O'Neill and L. McCormick; and the Valley Sand & Gravel Corporation, Rochester, formed with a capital of $80,000 by J. A. Taylor, L. M. Beattie and W. J. Gilmore. The Holloway Sand Co., Buffalo, has increased its capital from $50,000 to $100,000 for proposed expansion.

The property of the Orleans County Quarry Co., located at Medina, N. Y., and other places in the immediate vicinity, has been sold at a public sale by those in charge of the affairs of




# GRASSELLI EXPLOSIVES

Pit and Quarry operators today realize that efficient man and mechanical power make the success of the stone industry possible only when efficient explosives are used.

"Grasselli" quality explosives have proved themselves to be the most efficient explosives science can produce.

Backed by years of practical experience in directing huge blasting jobs, the Grasselli Powder Company offers you a powder and a service of demonstrated value, which will help you to increase production and cut down operating expenses.

Let one of our engineering experts work with you in solving your blasting problems. Write for further information regarding "Grasselli" Service. We will be glad to reply promptly and in full detail.

## THE GRASSELLI POWDER CO.

CLEVELAND, OHIO

the creditors of the company. The sale is understood to be subject to a mortgage to secure the bonds of the company, on which there is due an amount of $325,000 and interest from January 1, 1917. The company was organized in 1906 with a capital of $600,000, and $350,000 first mortgage bonds. It purchased the quarries of the Medina Quarry Co., after that company went into bankruptcy. The property sold, which does not become final until the expiration of 15 months allowed for redemption, comprises a total of 28 quarries.

The pressing conditions of the markets at New York and vicinity are causing owners of sand and gravel pits in New Jersey to resort to every feasible means of making their properties workable. In the South Seaville district of the state, the different owners are making use of dynamite to break the freeze-up of the pits.

Among the new companies in the industry in New Jersey to be formed during the past fortnight are the Greenstone Milling Co., Belvidere, with capital of $200,000, to operate stone quarries in this section, and headed by William C. Snyder, Jerry C. Berger and G. Howell Mutchler; and the Bellmayr Sand Co., Camden, organized with a capital of $125,000 by George Saunders, Charles P. Halyburton and J. Harry Smith, to operate sand properties.

There is considerable activity in the sand, gravel and stone industries throughout Pennsylvania, and a big spring season is anticipated. The majority of the cement companies in the Lehigh Valley section have advanced the wages of employes, early in February, and others plan to inaugurate similar increases at an early date. The Atlas Portland Cement Co., Northampton, has placed a 10 per cent wage increase in effect, to include about 2,200 employes; the Alpha Portland Cement Co. has granted an increase of 3 cents an hour to all employes at its works at Easton, Pa., Alpha, N. J., Cementon, N. J., Jamestown, N. Y., and Manheim, W. Va.

The North Bangor quarry, Bangor, Pa., is planning for the immediate rebuilding of its engine house, recently destroyed by fire. Considerable equipment was damaged. The powder house of the National Limestone Co., Shrader, near Milroy, Pa., was destroyed as the result of an explosion on February 16. A new organization, to be known as the Quarry Supply Co., has been formed at Bangor, with capital of $10,000, to manufacture and deal in quarry equipment of various kinds. William H. Smith, Bangor; Nicholas M. Mall, Pen Argyl; and William Bray, East Bangor, head the company.

In connection with limestone activities in Pennsylvania, the Limestone Operators Association of the state held an interesting meeting, in connection with a luncheon at the Penn-Harris Hotel, Harrisburg, late in January. General conditions were discussed, and plans developed for activity in the trade during the coming year.

For the winter season, operations in the sand and gravel industry are very brisk in the Pittsburgh, Pa., district. The different companies in this section are keeping things going to the highest possible extent, despite the weather handicap. The Keystone Sand & Supply Co. is arranging for the early delivery of about 3,000 tons of river sand and gravel to be used for the foundation work of the new plant of the Pittsburgh Knife & Forge Co., at Coraopolis on the Ohio River. The Rodgers Sand Co. is another active organization at the present time, and has been making a number of important shipments.

# Elevating, Conveying

*and*

# Power Transmitting MACHINERY

*for*

## Gravel, Sand and Stone Plants

SCREW AND BELT CONVEYORS.

BUCKET ELEVATORS, with buckets on chain or belt, furnished with or without steel casings.

BUCKETS—standard types in steel or malleable iron, steel buckets of special design made to your specifications.

GEARS—MACHINE MOLDED or with CUT TEETH.

CHILLED RIM SPROCKETS.

CHAIN—standard malleable detachable, Ley bushel, steel or malleable roller.

SHAFTING, PULLEYS, BEARINGS, FRICTION CLUTCHES.

***Send for Catalogue No. 38***

## H. W. CALDWELL & SON CO.

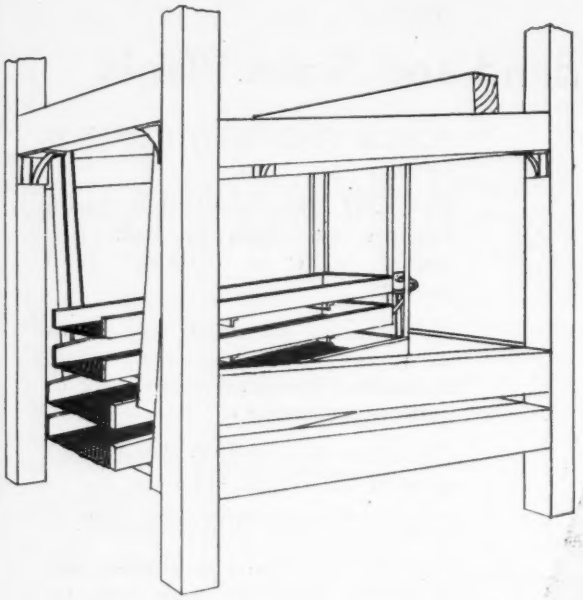
**CHICAGO**

**Western Ave., 17th and 18th Sts.**

## Economy Gyrating Shaker Screen

Henry W. Falker, of Ashland, Pa., has recently secured a patent on a screen for sizing all kinds of materials for industrial and commercial purposes, including coal, stone, gravel, sand, gypsum, cinders, etc. The object of the inventor was to devise a screening apparatus simple in construction, economical, and with at least 90 per cent of the screen surface in use.

The device consists of flat screens fastened in wooden or metal frames,



given a slight pitch toward one end, and attached at the upper end to a portable shaft by means of an eccentric bearing. These screens may be superimposed one above the other, and as many as may be needed to provide the desired number of sizes of material.

Mr. Falker is a designer and builder of screening plants and has developed this device in the course of his work along this line.

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The Universal Sand Company, New Castle, Pa., has increased its capital stock from $39,500 to $50,000.

## Consultant on Hydraulic Work

Mr. Pierce J. McAuliffe, who left the Morris Machine Works in 1917 to join the Emergency Fleet Corporation, resigned as manager of ship construction from that organization on December 1st, and has now opened a consulting engineering office at 55 Liberty Street, New York City.

While Mr. McAuliffe will retain his connection with shipbuilding in that he will make reports and investigations of shipyard operation and management, he expects to devote the greater part of his time to hydraulic dredging and to the pumping of sand, gravel, coal, tailings and other solids.

For seven years previous to the war Mr. McAuliffe was designing and sales engineer in charge of dredging and marine equipment for the Morris Machine Works of Baldwinsville, New York, the oldest manufacturers of hydraulic dredging machinery in the country.

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The capital stock of the Leesburg Silica Sand Company, New Castle, Pa., has been increased from $8,000 to $23,000.

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Announcement is made by the Atlas Powder Company of Wilmington, Del., of the removal of their general offices to 140 North Broad Street, Philadelphia, Pa.

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The Schaffer Engineering & Equipment Company, Pittsburgh, Pa., has perfected arrangements for a Chattanooga, Tenn., office to cover the southern territory. It is located in the James Building, that city.

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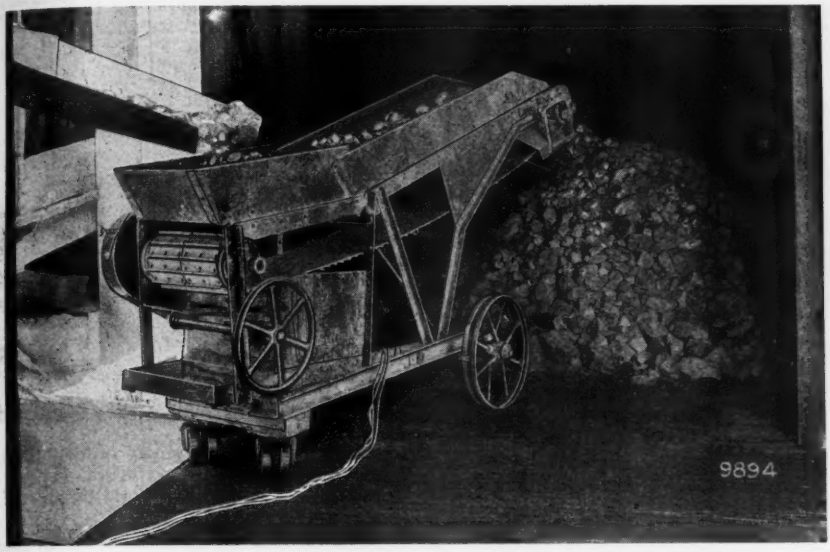
The Coast Rock & Gravel Company, San Francisco, Cal., is a recent incorporation. It is capitalized at $250,000.




# Loads a Car an Hour

Limestone, as shown in the illustration, can be loaded quickly and cheaply with the Pratt Box Car Loader, and two men. You know how many men you employ to do this work now and how long it takes. How they hate to handle hot lime in a box car on a hot day. You can readily figure what this machine will save in time, labor and handling costs and how soon it will pay for itself and the increased daily profits it will provide thereafter.

This machine is adapted to small and moderate sized plants, while for large plants the Manierre Box Car Loader has proved itself highly efficient. Let us send you further information.

## LINK-BELT COMPANY

**Philadelphia, Hunting Park Ave. and P. & R. Ry.** **Chicago, 329 W. 39th St.**
**Offices in all principal cities**

# LINK-BELT

## Labor-Saving Machinery

## New Radial Type Loader

In recent years the increasing use of sand, gravel, crushed stone, ashes, slag, etc., for road building, concrete work and other purposes, as well as the increased storage of coal and coke, has caused the handling and re-handling of immense quantities of loose materials.

During the time that help was plentiful and cheap, the prevailing method was to use a gang of laborers to shovel materials from ground storage to wagons or trucks. However, the constantly increasing cost and acute shortage of labor demanded the substitution of mechanical handling machinery to replace the old expensive and laborious "hand shovel" method.

To meet this demand the Jeffrey self-propelling loader was brought out about 10 years ago, after extensive experiments and tests and careful study of the then existing conditions, being the first machine of its kind to be placed on the market, and has proved a remarkable labor saver and quick handler of materials.

It has been used with great success by hundreds of leading concerns; but in order to meet developments in the various industries and the constantly changing conditions, the Jeffrey Company has developed an improved design known as the Radial Loader, which overcomes all the objections of the old type of machine, and is the last word in design and construction.

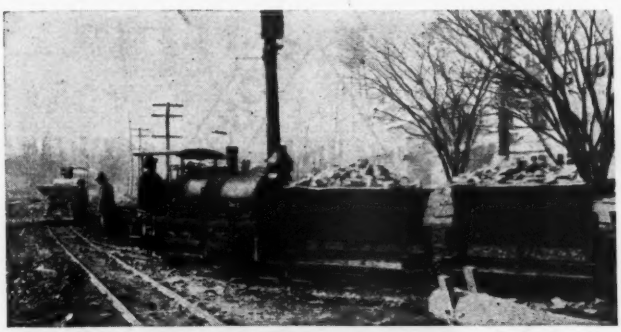
There is a great advantage in having the loader feed itself into the pile over other methods of hand shoveling or using a special mechanical device to pull the materials in front of the buckets. The greatest objection to the old four-wheel type of self-propelling loader was its inability to feed into the pile.

The three-wheel construction of the Jeffrey Radial Loader enables it to move backward and forward along straight lines into a pile of material or to cut wide swaths across the face of a pile by swinging alternately upon its driving wheels as pivots, which action is obtained through the use in its driving unit of a set of differential gears, the same as in an automobile.

By turning the steering wheel at quite an acute angle to the driving wheels, the discharge chute will remain practically stationary at the center of the circle while the pick-up end of the extending elevator boom will travel in a circular path or by alternately reversing the propelling drive, the loader will oscillate back and forth in an arc. If the steering wheel is gradually turned through a few degrees either way from the above circular path, the whole machine, while cutting from right to left in an arc will gradually move forward into the pile.

The Radial Loader is designed to handle heavy materials such as crushed stone, sand, gravel, coal, etc. The large wheels enable it to pass over soft, rough or uneven ground, and it will rigidly maintain its equilibrium under all conditions of ordinary rough storage ground or floor.

The Radial Loader is equipped with either electric motor or gasoline engine. Skilled labor is not required for its operation and all controlling levers are in plain sight and in easy reach of the operator.



# SPEED
## ON ROUGH TRACK

is a very important factor in the production of capacity output. Appreciating this, we build

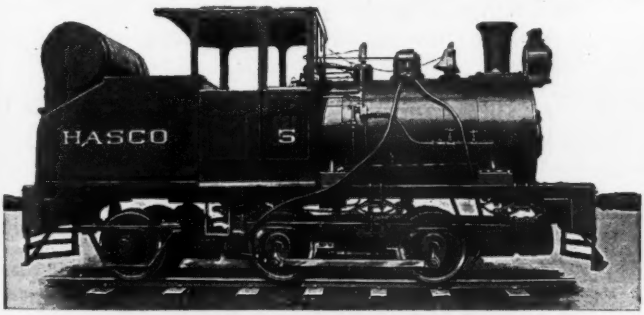
# BELL LOCOMOTIVES
### (Steam—Oil Burning—Geared Type)

with a low center of gravity and flexible frame, permitting speedy travel over rough, uneven track and road bed.

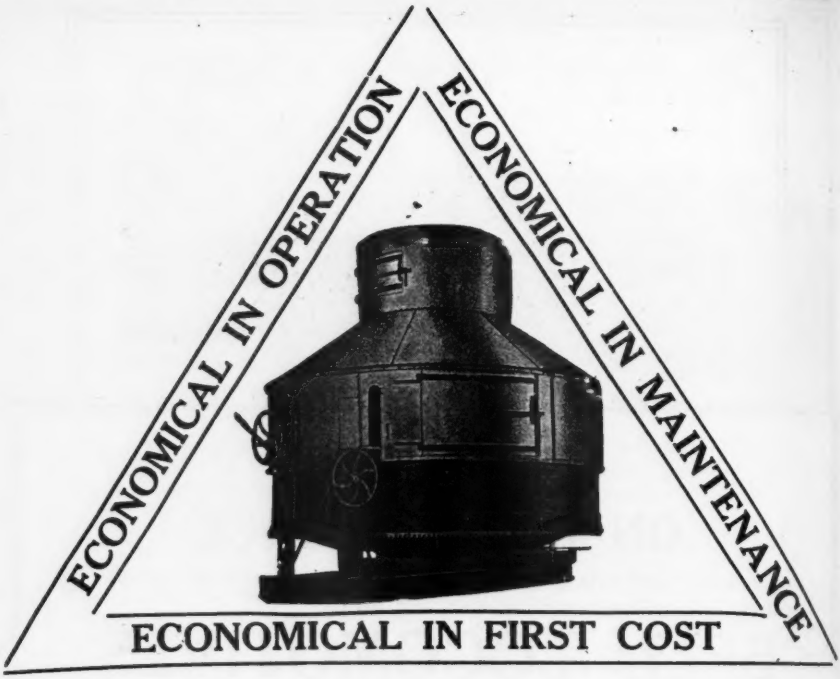
One of the users of BELL LOCOMOTIVES is the Law Moor Iron Co., of Virginia, using 3, in what is said to be the largest underground lime quarry in the world. Ask for Bulletin 133 describing our various styles and sizes of oil-burning steam locomotives.

**Bell Locomotive Works, Inc.**

**23 Water Street** **NEW YORK**




**BELL ARTICULATE LOCOMOTIVE**
**Sizes 15-16-17-18-20 Tons.**
**Style Shown at Top of This Ad—3 to 15 Tons Capacity.**




Viewing it from all sides, the Clyde Lime Hydrator makes the best hydrate from either high calcium or magnesia that can possibly be made from the lime furnished.

To get the best results, the proper amount of lime and water must be thoroughly mixed, and this is what the Clyde does. This is the key to the best results of hydrating.

When you apply the water to the lime and it is thoroughly mixed, nature does the rest.

In the Clyde you can always see just what you have and cannot make any mistakes.

*Please write for catalog*

## H. Miscampbell

**306 South First Avenue, E.** **Duluth, Minn.**

# —THE ALLY—

## Conveyor and Transmission Belting

**Highest grade stitched fabric belt on the market**

***Let us figure on your requirements***

**Manufactured by**

## THE ALLIED BELTING CO.

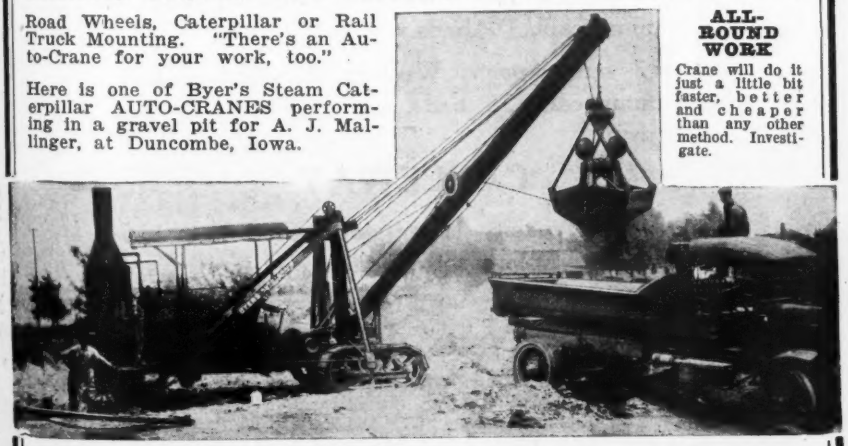
**GREENVILLE, OHIO**

# Byers' Auto-Crane

**STEAM GASOLINE ELECTRIC POWER**

Excavating, Stripping, Material Handling, Car Unloading, Derrick Work, Road Wheels, Caterpillar or Rail Truck Mounting. "There's an Auto-Crane for your work, too."

Here is one of Byer's Steam Caterpillar AUTO-CRANES performing in a gravel pit for A. J. Mallinger, at Duncombe, Iowa.



**ALL-ROUND WORK**

Crane will do it just a little bit faster, better and cheaper than any other method. Investigate.

**THE JOHN F. BYERS MACHINE CO.**

**430 SYCAMORE STREET RAVENNA, OHIO**

# Steam Shovels

Special attention is called to the following thoroughly overhauled shovels.

1—Model 0 Thew, shop number 1084.

2—Marion 60 Steam Shovels with 2½ yard dipper, Shop Nos. 1995 and 2059.

## LOCOMOTIVES

1—Fate 3-ton Gasoline Locomotive.

1—60 ton, 18x24, six wheel Switching Locomotive, standard gauge, 150-lb. pressure, INTERSTATE Certificate.

1—36 ton, 14x20, H. K. Porter Saddle Tank Locomotive, standard gauge.

6—18 ton, 10x16, H. K. Porter Dinkeys, 36″ gauge.

## CARS

40—12 yard capacity Western, standard gauge air dump cars, 19′ beds.

30—12 yard capacity Western, standard gauge air dump cars, 26′ beds.

## CABLEWAY

1—3 ton capacity Lidgerwood Cableway 1164′ span, complete with Lidgerwood 9x10 Cableway engine.

**In addition to the above, we have a large stock of contractors' construction equipment of various classes.**

**H. Kleinhans Company** Union Arcade, Pittsburgh, Pa.

# WE BUY—
# REBUILD—
# SELL OR RENT

# CONTRACTORS EQUIPMENT

## DERRICKS

1—All Steel Stiff Leg, mast 36-ft., boom 60-ft.
1—Stiff Leg, boom 16-in. x 16-in. x 80-ft., mast 16-in. x 16-in. x 50-ft., bucket operating, like new.
7—Stiff Leg Derricks, boom 14-in. x 14-in. x 60-ft., mast 12-in. x 12-in. x 32-ft., sills and legs in proportion, Terry & Tench fittings, 4 arranged for clam shell, 3 for single line.
1—Shannon Traveling Derrick, complete with 60-ft. boom, 30-ft. mast, with 32-ft. travelers, on R. R. wheels.
1—Stiff Leg, 40-ft. boom, capacity 3 or 4 tons.
2—Breast Derricks.

## HOISTS

1—10 x 12 D. C. 3 drum with attached swinger Flory with butt strap boiler.
1—10x12 D. C., D. D. Lidgerwood, with banked levers, no boiler.
3—9½ x 12 D. C. 3 drum with boiler, 2 Lamberts and one National with attached swinger.
10—8¼ x 10 D. C., D. D. with boiler, American, Lambers, Lidgerwoods, Flory, Clyde or Mundy.
1—8¼ x 10 D. C., D. D. Reliance with attached swinger, with boiler.
4—7½ x 10 D. C., D. D. Lambert, with boiler.
15—7x10 D. C., D.D. with boiler, American, Lidgerwood, Lambert, O. & S., Mundy, Clyde and Flory.
4—7 x 10 D. C., D. D. without boiler, Mundy, National and Flory.
3—5 x 7 D. C., D. D. Byers, with boiler, one reversible.

## STEAM SHOVELS

1—Type B Erie fully revolving ¾ yd. dipper, traction wheels.
2—Type O Thew, fully revolving, ⅝ yd. dipper, traction wheels.
1—Model 60 Marion, standard gauge, MCB equipped.

## EXCAVATORS AND BACKFILLERS

3—Keystone Excavators, steam engine, boilers, complete with skimmer scoops.
1—Buckeye Wheel Type Trenching Machine, No. 4, with gasoline engine, on caterpillar traction.
4—Austin Backfillers, with gasoline engine, boom type, on caterpillar traction.

## LOCOMOTIVES

1—Porter 10 x16, 4-wheel saddle tank, steam, 36-in. gage, 18-ton.
1—Vulcan 9 x 14, 4-wheel, saddle tank, steam, 36-in. gage.
1—Davenport, 9½-ton, 24 gage, steam, 4-wheel.
1—Porter 6 x 10, 4-wheel, 36-in. gage, 5-ton.
2—Plymouth, 6-ton gasoline, 24-in. gage.

## BUCKETS

1—Brand new 2½-yd. Butler dragline bucket.
1—¾-yd. Owen clam shell.
1—1-yd. McMyler clam shell.
1—1-yd. Hayward orange peel.
Several others of various makes and sizes.

## WAGON LOADERS

6—Jeffrey Portable gasoline driven traction bucket wagon loader, like new.
1—Haiss Portable gasoline driven traction bucket type wagon loader, like new.

## CARS

15—24-in. gauge Koppel V-shaped, 1-yd. side dump cars.
35—36-in. gauge, 4-yd. Western side dump cars.
12—12-yd. standard gauge, side dump.

## TRACK

6,500 lineal feet, 24 in. gauge, 16 lb., with steel ties.

**These are only a few items of the equipment we own. If you do not find what you want, write or wire us your requirements.**

*We are in the market for used equipment of all kinds. Write us, giving full description and price*

# Equipment Corporation of America

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# MARSH'S
# Quarry Specialties
## GUARANTEED

**BUCKETS**

1—1 yd. Orange Peel.....$ 300
1—1-yd. Dragline, Page..... 300
2—1-yd. Concrete at $50 each..... 100
1—1½-yd. McMyler (new)..... 500
3—2-yd. Brown Hoist at $500 each. 1,500

**BOILERS**

1—200 H.P. Scotch Marine ..... 2,000
1— 30 H.P. Upright ..... 200
1— 15 H.P. Upright ..... 100
1— 60 H.P. Upright ..... 800
1— 50 H.P. Upright ..... 700
2— 60 H.P. Erie Economic at $750 each ..... 1,500

**CRUSHERS**

1—No. 12 Gates Style K manganese fitted nickel steel shaft (almost new) ..... 8,000
1—No. 7½ Austin Gyratory..... 2,500
2—20x24 Blake, each..... 2,000
1—No. 4 Gates Gyratory..... 1,000
1—10x20 Blake ..... 750

**COMPRESSORS**

1—Rand Imperial Duplex, cap. 1,500 ft. ..... 2,000
1—Ingersoll, 2-stage, air, belt drive, 600 ft. ..... 1,000

**DIPPER**

1—2¼-yd. Bucyrus ..... 500
1—¾-yd. Browning with boom and engine (new) ..... 750

**DRILLS**

8—Chicago Pneumatic Tool Co. 3¼ in. drills, each..... 100

**DERRICKS**

1—5-ton Stiff Leg with steel bull wheel ..... 500
1—2-ton Stiff Leg..... 200

**ENGINES**

1—150 H.P. Atlas Automatic.....$ 750
1—200 H.P. Allis-Chalmers Corliss. 1,250
1— 20 H.P. Erie Center Crank..... 200
1— 70 H.P. Erie Center Crank..... 300
1— 15 H.P. Keystone Reversible... 250
1—Westinghouse ..... 250
1—150 H.P. Stillwell Bierce..... 150

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2—6¼x10 American Hoist and Derrick with boiler at $750 each.... 1,500
2—6x8 Contractors' Plant Co. S. C. S. D., at $200 each..... 400
1—8x12 Lidgerwood D. C. D. D.... 500
1—12x14 Special Dragline, 90 H.P. (new) ..... 1,500
1—9x10 D. C., 3-drum Cableway Engine ..... 1,500

**LOCOMOTIVES**

1—Vulcan 36-in. gauge Saddle Tank 1,000
1—Porter Standard Gauge Saddle Tank, 14 tons..... 2,000

**PUMPS**

1—No. 5 Pulsometer..... 100
1—Wilson-Snyder Water Works, 3,000,000 gals. per day..... 1,500

**ROLLERS**

1—10-ton Steam Roller..... 1,000

**SCREENS**

1—42-in. by 14-ft. Screen complete.. 400
2—Stephens & Adamson at $150 each ..... 300

**SHOVELS**

1—Model 28 Marion Traction, fine.. 4,700
1—Vulcan-Bucyrus Revolving Shovel, standard gauge, perfect..... 3,250
1—70 C. Bucyrus with standard, also stripping booms and dippers.....11,000

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Successors to

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**Contractors' & Railway Equipment**

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LOCOMOTIVE CRANES
LOCOMOTIVES
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HOISTING ENGINES
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## MACHINERY—For Sale—DERRICKS

Road Roller—8-ton Wheeling tandem, A-1 shape; price $1,800.00.
Road Rollers—5 and 10-ton.
We have on hand 5 Road Paving Concrete Mixers, Koehring-Foote-Municipal

10 Barnes Force Pumps with Novo Gasoline Engines, 225-lb. pressure. Pumps 1,500 gallons per hour through 20,000 feet of 2-inch pipe, 3"x5" and 4"x5".

## STEAM BOILERS

50 H.P. vertical boiler.
125 H.P. firebox boiler, Butt Strap.
70 H.P. Erie Economic boiler.

7x10 Lidgerwood D. C. swinging or car pulling hoisting engine.
7x10 double drum double cylinder hoisting engine.
6¼x8 double drum, double cylinder hoisting engine.
8¼x10 three drum, double cylinder hoisting engine.
Clam Shell Buckets, ½, ¾ and 1 yard.
Channon Drag scraper Bucket.

Hayward Orange Peel Bucket 1½ yard.
Vulcan Pile Hammers, Steam and Drop.
Steam Rock Drills, Sullivan-Ingersoll.
Air Compressors, all sizes.
Pulsometer and Nye Steam Pumps.
Centrifugal Water Pumps.
Pulleys and Shafting, all sizes.
Friction Hoisting Drums.
Wire Rope Sheaves, Blocks and Bronze Bushings for Sheaves.

Big lot of wide elevator and conveyor belting.
Lot of 15-in. steel elevator buckets.
All kinds of pipe and steel rails.

The above is just a partial list of what we have. We are offering for sale over $500,000 worth of all kinds of good used machinery of every kind such as you need, and we can save you a lot of money on your requirements. We also manufacture a full line of steel and wooden derricks, portable derricks, portable clam shell bucket cranes, cableways, drag scraper outfits, screens, elevators, hoisting engines, gasoline engines, pumps, steam boilers, smoke stacks, Koppel cars, steel rails, crushers, Barge Derricks.

Write to us. We know what we are doing, can save you money and give you the quickest shipment of any manufacturer.

**Wilson Machinery Company**

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*Full Revolving Self-Propelling*

# LOCOMOTIVE CRANES

**Mounted on Traction Road Wheels, Equipped With 30 ft. Booms and ¾ yd. Clamshell Buckets**

*ALL BRAND NEW*

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***Contractors' Equipment of all Kinds***

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2—30 ton, 18 in. new three sheave special heavy Boston & Lockport wire rope blocks with shackles.

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1—1¼ yd. Hayward Class E Clam Shell (ore bowl).
1—1¼ yd. Hayward Multipower Orange Peel.
10—2½ yd. Excelsior Bottom Dump
12—3½ yd. Steubner Controllable Bottom Dump.
20—4 yd. (4 chain) extra heavy steel skips.

## CHANNELING MACHINES

2—Ingersoll-Rand H8, one with and one without boiler.
1—Sullivan Y-8 with boiler.

## COMPRESSORS

1—950 ft. Ingersoll-Sargent straight line simple steam, two stage air.
1—1300 cu. ft. Ingersoll Sargent belted with 200 H.P. 3 ph. 60 cycle, 2200 volt motor.
1—2400 cu. ft. Ingersoll-Rand two stage air cross compound with corliss valves.

## CRUSHERS

1—No. 5 Style "K" Gates Gyratory.
1—No. 7½ Style "K" Gates Gyratory.
1—No. 21 Style "K" Gates Gyratory.
1—60x84 P. & M. Superior Jaw.

## DERRICKS

1—15 ton 100 ft. boom American Steel Guy.
1—3 ton American self slewing Steel Guy Crane Derrick with 60 ft. horizontal boom and engine on mast.

## DRAGLINE OUTFIT

1—70 ft. boom heavy A-frame outfit with bull wheel, on rollers for handling 1½ yd. Page Bucket, with 10x12, 3-drum American Engine with extra large boiler and 7x8 separate American Swinging Engine.

## HOISTS

1—6¼x8, d. c. d. d. Lidgerwood with boiler.
1—8¼x10, d. c. d. d. & Swinger Lidgerwood.
1—9x10, d. c. d. d. & Swinger Lidgerwood.
1—10½x12 d. c. d. d. & Swinger Lambert.
1—60 HP. d. d. & Swinger Lambert Electric.

## LOCOMOTIVES

(STANDARD GAGE)

2—12x18, 4 wh. American Saddle Tank.
3—13x18, 4 wh. American Saddle Tank.
1—14x22, 4 wh. Baldwin Saddle Tank.

## MOTOR

1—400 HP. Squirrel Cage G. E. Motor for 3 ph. 60 cy. 2200 volts current.

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2—40 in. x 15 in. Allis-Chalmers "Anaconda" type.
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1—No. 69 Osgood 2¼ yd. dipper.
1—No. 70C Bucyrus 2 yd. dipper.
1—No. 95C Bucyrus 3½ yd. dipper.
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Also Drills, Screens, Pumps, Locomotive Cranes and Road Cranes.

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**Slightly Used—Prompt Delivery**

60 H.P. Fairbanks Morse
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25 H.P. Fairbanks Morse
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## Standard Gauge Locomotives

2—19-ton, four-driver saddle-tank Porters.
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1—40-ton, 17x24 in. four-wheel switcher.
2—50-ton, 18x24 in. six-wheel switchers.
1—14-ton, 9x14 in. 36 in. gauge Vulcan.

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30—1½yd. steel, "V" shaped, 36 in. gauge dump cars.
1—Western standard gauge spreader.
1—Model 76 Marion steam shovel, No. 3503.
1—Model 28 Marion, traction.
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2—1-yd. Foote side discharge concrete mixers.

Also Railway Equipment, etc.

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**Sand and Gravel Pumping Outfit**

complete, consisting of 10-inch Morris Pump, direct connected to 9x9 in. Double Engines; 125 H. P. Boiler; Dake one drum Hoist. All in splendid condition and priced right. Are installing electric power.

**The Lincoln Sand and Gravel Co.**

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**FOR SALE**

3—No. 6 Williams swing hammer mills.
2—No. S-5 Pennsylvania swing hammer mills.
All in good condition.

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# For Immediate Delivery From Our Own Yards

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1—5½x10 Mundy D.D. D.C. with boiler.
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1—7½x10 Lambert D.D. D.C. and swinger with boiler.
1—7½x10 Lambert D.D. D.C. with boiler.
1—7x10 Stroudsberg D.D. D.C. cableway with Mass. Std. boiler.
1—7x10 Lidgerwood 3 D.D. D.C. with Mass. Std. boiler.
1—10x12 Lambert 3 D.D. D.C. with boiler.
1—7x10 Lidgerwood D.D. D.C. skeleton.
1—7½x10 Lambert D.D. D.C. skeleton.
1—8½x10 Lambert 3 D.D. D.C. skeleton.
1—43 H.P. Lambert electric 550 volt D.C. double drum swinger.
1—40 H.P. Lambert electric 550 volt D.C. double drum and swinger.
1—60 H.P. Lambert electric 220 volt D.C. double drum swinger.

**BOILERS**

1— 25 H.P. Ames on wheels, 100-lb.
1— 40 H.P. Ames on wheels, 100-lb.
2— 40 H.P. Ames on skids, 100-lb.
2— 50 H.P. Robb on wheels, Mass. Std., 110-lb.
1— 35 H.P. Ames with engine on wheels, 100-lb.
1— 25 H.P. Vertical, Mass. Std., retubed.

**COMPRESSORS**

1—Ingersoll Rand Portable 6"x6" with 10 H.P. gasoline engine, capacity 44 cu. ft., 100-lb.

**AIR COMPRESSORS**

1—750 ft. McKiernan steam driven.
1—1000 ft. McKiernan steam driven.
1—150 ft. Chicago Pneumatic portable, gasoline

**CRUSHING PLANT**

1—Acme jaw crusher 10x18.
2—Farrell jaw crusher 9x16.
1—No. 4 Champion jaw crusher, 9x15.
1—No. 5 Champion jaw crushers 11x26.
1—No. 4 McCully gyratory crusher.
1—No. 7½ Kennedy gyratory crusher.
4—Climax Portable Plants complete.

**Complete line of buckets, derricks, cranes hoists, locomotives, cars, steam shovels, and contractor's equipment for your service.**

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**CRUSHERS**

1—No. 21 Gates Gyratory
2—No. 12 Gates Gyratory
1—No. 10 Gates Gyratory
1—No. 10 Kennedy Gyratory
1—No. 9 Gates Gyratory
3—No. 8 Gates Gyratory
4—No. 7½ Assorted Gyratory
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**J. F. DONAHOO CO.** **Birmingham, Ala.**

# STONE CRUSHERS

Need one? Then get in touch with us before otherwise supplying your requirements. We are headquarters for good "used" machinery of this character and have many bargains in:

**Gyratory Type: Size No. 2 to No. 21, nearly all makes.**
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**Pulverizers: Have quite a few, including a Sturtevant No. 2 Duplex Ring Roll Mill, a Williams No. 10 Deck Sweeper, a Jeffrey A-7 Heavy Duty, a Jeffrey No. 2, a Gardner No. 1, Etc.**

We can serve you equally as well in Locomotive Cranes, Locomotives, Cars, Hoisting Engines, Air Compressors, Etc.

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**Dealers in USED But NOT ABUSED Machinery**

## Electric Hoist Motors

2—75-HP. G. E., D. C., hoist motors, complete with resistance and drum controllers, 230 volts.

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1—Dayton centrifugal pump, 5" suction, and 4" discharge, complete with accessories.

1—Worthington centrifugal pump, 6" suction and 8" discharge, complete with accessories.

2—4" Morris Machine Works electric centrifugal sand pumps, with or without motors.

1—12" Morris Machine Works electric centrifugal sand pump with or without motor.

For quick sale, very cheap.

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2 Ditcher scoops, 24 in. x 36 in.
1 Side hill digger.
1 Skimmer scoop. Good condition.

**DAVENPORT LOCOMOTIVE**
11x16, standard gauge, 20-ton.

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13x18, standard gauge, 30-ton.

**BROWNING CRANE**
10-ton, 36-in. boom, D. D.

**MOORE BROTHERS**
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## Locomotive Crane

1—10-ton Industrial, 8-wheel MCB crane with 45 ft. boom and yard bucket.

Steel underframe and 24 ft. steel bunk. Just through the shop and ready for instant delivery.

**Machinery Warehouse Co., Inc.,**
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## Twenty Acres Best Gravel Land

**In Indiana, twelve inches of stripping, located on two railroads. For further information write**

JAS. D. McCARTHY,
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1-10 in. Manganese Steel Dredge Pump, with extra propeller, belted, suction pipe and strainer.

1½ yd. Negley Slack Line Bucket and Carriage.

550 ft. 1⅜ in. Hercules Cable.

150 No. 7½ Buckets, 26"x10"x 13½", ¼" steel.

Above all in good condition.

**The Carmichael Gravel Co.**
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Limestone Quarry—well equipped with machinery and tools. Quarry is 12 miles north of Cape Girardeau, Mo., on Frisco R. R. and Mississippi River.

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# FOR SALE

## CRANES.

1—17-ton Industrial 42′ Boom. 1—35-ton McMyler 50′ Boom
1—12-ton Industrial 38′ Boom equipped with magnet.

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1—76 Marion R. R. type 3½-yd. dipper.
2—70 C. Bucyrus R. R. type 2½-yard. dipper.
1—60 Marion R. R. type 2½-yd. dipper.
1—60 Marion R. R. type 1¾-yd. dipper.
1—No. 1 Thew Traction type 1-yd. dipper.
1—No. 0 Thew Traction type ¾-yd. dipper.

## DRAGLINE.

1—No. 261 Marion dragline 3½-yd. dipper.

## TRENCHING MACHINES.

1—No. 24 Parsons Gasoline Trencher.
1—Large Parsons Caterpiller Traction trencher.
1—No. 10 Parsons Backfiller gasoline, one man.

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16— 6-yard Continental two-way dump cars S. G.
90—12-yard all steel Western two-way dump cars S. G.
15—20-yard all steel Western two-way dump cars S. G.

**RAILWAY MOTOR CAR CO. OF AMERICA**
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Two Berg Dry Presses in excellent working condition. Capacity, 18,000 to 22,000, 9-inch brick, 10-hour day. These are offered at a bargain. Write us for further particulars.

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| 1 Freight Elevator, Complete, with 5 HP motor | $ 300.00 |
| 1 Horizontal Side Crank Steam Engine, size 7x10 | 125.00 |
| 1 Cook Gasoline 12 HP Vertical Engine | 200.00 |
| 2 Fairbanks Morse 12x7x12 High Pressure Pumps 8″ suction, 6″ discharge, each | 325.00 |
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| 300 Kopple Steel Track Ties, 24″ gauge, each | .35 |
| 40′ No. 10 Gauge Steel Smokestack, 42″ diameter, per foot | 5.00 |
| 16 Boiler Tubes, 2″x8′, each | 1.75 |
| 600′ American Spiral 5″ Pipe, per foot | .25 |
| 1 Hendy Giant, 1¼″ Nozzle | 60.00 |
| 16 Car Trucks, 48″ gauge, per truck | 10.00 |
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LEATHER RUBBER **BELTING** STITCHED CANVAS
An Enormous Stock of New and Used Power Transmission Machinery, Belting, etc.
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Quarry leasehold, near Philadelphia. Quarry fully equipped with plant and railroad siding for large contracts. **Apply to 5654 Matthews Street, Germantown, Phila., Pa.**

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**CABLEWAY EXCAVATOR**

For Excavating, Stripping, Hoisting, Conveying, Dumping and Loading any material that may be dug with dragline bucket.

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1—Byers Auto Crane, Model "B."
1—Byers Auto Crane, Model "C."
1—Road Crane, full revolving, self-propelling, mounted on traction wheels, 30-ft. boom, ¾-yd. clamshell bucket.

**Steam Shovels—Crushers—Boilers—Engines, Etc.**

**THE MILROSE COMPANY**
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Telephone Majestic 7431.

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**Quarry Enlarging Its Capacity Wants to Buy**

1—Large jaw crusher, 1,000 to 2,000 tons in 10 hours.
2—No. 5 or No. 6 gyratory crushers.
2—¾-yd. or 1-yd. steam shovels.
1—Keystone excavator.
1—Blast hole well drill.
1—70-ft. elevator, 30 or 36 in. buckets.
1—60-in. screen, 26 to 30 ft. long.
1—Hammer mill pulverizer.
20 lb. rails.
2-ton to 3-ton dump cars.

**Address Box 30, care Pit & Quarry, 538 S. Clark St., Chicago, Ill.**

## FOR SALE

**Stiff Leg and Guy Derricks**
**Two and Four-Drum Hoisting Engines**
**Air Compressors, Air and Steam Drills**
**24" and 36" Dinkey Locomotives**
**24" and 36" gauge Koppel Cars**
**24" and 36" gauge Western Dump Cars**
**Steam Shovels and Drag Lines**

**ELLIS WOOLMAN**
117 27th Ave., S. E.
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## Wanted:—A1 Condition

Limestone Crusher, 25-30 ton capacity.
Chain drive bucket elevator.
Screen with dust jacket.
Storage stone bin, 125-ton capacity.
5,000-lb. capacity single line drum hoist.
30-gauge portable track with spurs and switches.
2-yd. end dump car.
Air compressor with tank and fittings, elec. driven. 200 cubic feet free air per minute.
30-ft. capacity air driven rock drill with steels, tripod and weights.
Drill sharpener.
Electric motors to operate same at 220 volts, 60-cycle, 3-phase, A. C.
Furnish price and specifications.

**Address Box 32, Pit and Quarry, 538 S. Clark St., Chicago, Ill.**

## No. 10K. GATES

Manganese fitted, regular drive
$6,000.00
Elevator, $1,400.00
**Immediate Delivery**
**ROSS POWER EQUIPMENT CO.**
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## STEAM SHOVEL

Have for immediate shipment a Model 50, 2-yd. capacity, Marion Railroad Type Shovel. Will stand most rigid inspection. Has seen very little actual work. Will price right for a quick sale. **Kansas City Machinery Supply & Pipe Co., 610 Railway Exchange Bldg., Kansas City, Mo.**

## WANTED

Dragline cableway excavator, with 150 to 200 ft. range. Steam or electric drive. State full particulars as to capacity, condition, make, price and location.

**York Brick & Tile Co., York, Neb.**

## FOR SALE

1—type "A" Erie Traction Shovel.
1—type "B" Erie Traction Shovel.
1—18 Osgood Traction Shovel.
Everything for the Contractor.
New and Used.
Send us your inquiries.
W. E. KENNEDY CO.
Union Bank Bldg., Pittsburgh, Pa.

## WANTED

A Bucyrus or Marion revolving traction shovel, that can handle a yard and quarter to yard and half dipper in stone. Address, **Box 31**, Pit & Quarry, 538 S. Clark St., Chicago, Ill.

## FOR SALE

7x10 Stroudsburg Cableway hoist and boiler
Porter 24-in. 8x14 saddle tank, overhauled.
Blake compressor, 12x14x12 duplex, 600 ft.
American compressor 10x10x10 duplex, 350 ft.
Ingersoll-Sergeant 12x14¼x14, 380 ft.

**WILLIS SHAW**
239 Railway Exchange, Chicago.

**ROAD ROLLERS**

1—10 ton, double cylinder, steam 3 wheel, Kelly Springfield Roller.
1—10 ton, double cylinder, steam 3 wheel, Monarch Roller.
1—10 ton, double cylinder, steam 3 wheel, Iroquois Roller.
1—10 ton, double cylinder, steam 3 wheel, Good Road Roller.
1—10 ton, steam 3 wheel, J. I. Case Roller.
1—10 ton, steam 3 wheel, Huber Roller with scarifier attachment.
1—6 ton, double cylinder, steam tandem, Kelly Springfield Roller.
1—10 ton, double cylinder, gasoline 3 wheel, Kelly Springfield Roller.
1—10 ton, 3 wheel, gasoline Austin Western Roller.

**SHOVELS**

1—Osgood Model 18 Steam Shovel, shop No. 511.
1—No. 0 Thew, with ⅝ yd. dipper.
2—Model 28 Marions, on traction wheels.
1—No. 3 Keystone, with skimmer and trench buckets.

**Write us your needs in Rock Crushers or Railway Supplies.**

**MIDWESTERN CO.**
Telephone Majestic 8356
140 So. Dearborn St. Chicago

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**For Immediate Delivery—Overhauled and Guaranteed—Largest Stock in America to Choose From. For Sale: 3 Phase, 60 Cycle, 220 V.**

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| 1— | 3 | Westinghouse | 1200 |
| 1— | 5 | Wagner | 1800 |
| 1— | 5 | Allis-Chalmers | 1200 |
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| 1— | 10 | Westinghouse | 900 |
| 2— | 15 | " Type CCL. | 1750 |
| 2— | 15 | Watson, slip-ring, var. speed | 1720 |
| 1— | 15 | Fairbanks-Morse | 1200 |
| 1— | 15 | General Electric, Form L | 1200 |
| 1— | 15 | General Electric | 1200 |
| 3— | 15 | Fairbanks-Morse, slip-ring, constant speed | 1200 |
| 1— | 15 | Westinghouse, vert. | 1135 |
| 2— | 15 | Allis-Chalmers | 1130 |
| 2— | 15 | Allis-Chalmers | 860 |
| 2— | 15 | Westinghouse | 850 |
| 4— | 20 | Westinghouse | 1750 |
| 1— | 20 | General Electric | 1200 |

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1—75-HP 500-v DC Westinghouse motors
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We Are Direct Agents for GENERAL ELECTRIC NEW MOTORS AND GENERATORS of All Descriptions

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20—Crushers, Nos. 2 to 10, mostly Gates
1—327 HP. W. T. boilers, $9.50 HP.
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30—Steam engines, 30 to 1,500 HP.
1—95 HP. Loco. type boiler
15—Steam and Centrifugal Pumps
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Concrete mixers, pavers, hoists, engines, electrical equipment.

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**Indianapolis, Ind.**

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Two large steel bins, hopper bottom. 450 ft. steel conveyor cashing for 16-in. screw conveyor, without lids.

One Special, 112 H. P., single-band, friction, electric hoist, complete. Almost new.

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**LOCOMOTIVE CRANES**

15-ton, 8-wheel Browning.
10-ton Brown Hoist.
10-ton Industrial.
5-ton Industrial.

**BYERS AUTO CRANE MODEL "B"**

**LOCOMOTIVES (36" Gauge)**

4—Porters, 9x14, Saddle Tank.
4—Porters, 11x16, Saddle Tank.
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2—4-ton Bell Oil, 24-in. Gauge.

**LOCOMOTIVES (Standard Gauge)**

1—35-ton Saddle Tank.

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1—No. 28 Marion, ¾-yard.
1—No. 1 Thew, 1-yard.
1—70-ton Bucyrus, 2½-yard.
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80—Standard Gauge, 50,000-lb. cap., with stake pockets.

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Road Roller, Paver, Crane, Industrial Track and complete equipment for road job.

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Man experienced and capable operating small sand dredging plant and installing modern equipment. Permanent position; good pay; pleasant and healthy surroundings. Plant located within city. B. B. TAYLOR, Macon, Ga.

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BUCYRUS 40-R — Yard and a half dipper, standard gauge type shop number 2254. Boiler perfect. Shovel in A-1 condition.

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Holt caterpillar tractor, gasoline driven, also 3 all steel roller bearing, reversible, bottom dump trailers, 6 yd. capacity, fine shape. This is a good hauling outfit.

Also 20 ton standard gauge Shay locomotive, 160 lbs. pressure.

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**Construction and Industrial Work**

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1—Model 40 Marion, Shop No. 1685, with 1½-yard dipper.
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1—Pittsburg, 35-ton, 4 wheel, saddle tank, Standard Gauge.
2—Porters, 15-ton, 4 wheel, saddle tank, 36" gauge.
3—Porters, 20-ton, 4 wheel, saddle tank, 36" gauge.
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Several gasoline locomotives, 24", 30", 36", 4'8½" gauge.

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3—No. 3½ Keystone, Shop Nos. 3275, 3276 and 3278.
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2,300' 4" black Pipe. Lot of Valves and Fittings.
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1—Derrick Car, standard gauge, 8¼x10 D. C. D. D. engine and boiler.

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LET US SOLVE YOUR MATERIAL HANDLING PROBLEMS

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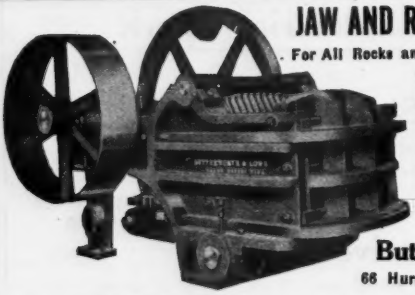
For All Rocks and Ores Softer Than Granite



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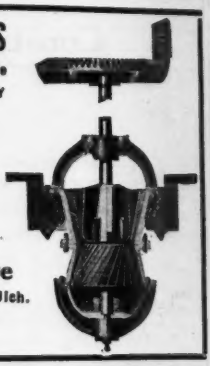

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Nippers—17x19", 18x26" 20x30", 24x36" and 26x42".

Rotaries—20" to 47" inside diameter. Many variations.

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**Grab Buckets**
MANUFACTURED BY
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## Union Steel Rivetless Chains

"The Chain of Double Life"
Fits Cut and Std. C. I. Sprockets
1 to 12 in. pitch.

High Carbon Links (STRENGTH) Large Glass—Hard, Reversible Bearings (DURABILITY), One-Piece Rivetless Construction (PERMANENCY) insure Trouble-Proof Money Saving Service. Bushing Chains, Roller Chains, Attachment Links, Buckets, Sprockets, Elevators, Conveyors, etc.

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One-man control. Operated upon Slack Cableway. One line does loading and dumping. Will discharge at either end of track line.

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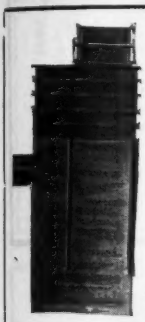

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INSTALLATION, OPERATING and REPAIR COSTS CUT IN HALF

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Complete Crushing, Screening and Washing Plants for Sand and Gravel — Bulletin C-2

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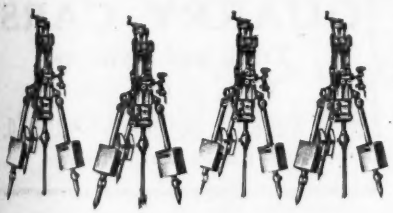

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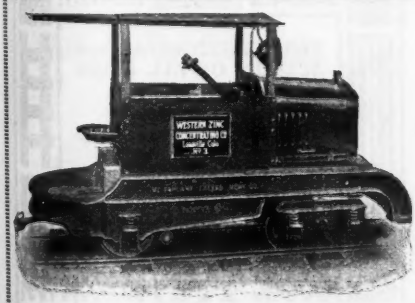
all sizes and for all purposes.

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adapted for very short curves

18 in. to 36 in. Gauge

300-lb.-600-lb. Draw-bar Pull

**Practical : : Economical**

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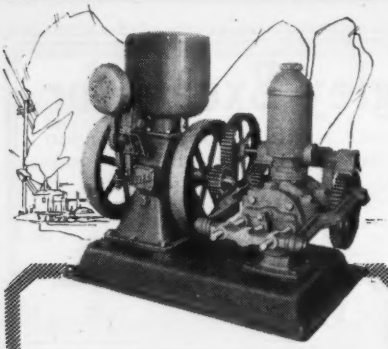

This is the Ideal Force Pumping Outfit for long distance pumping. Furnished in 2½ to 10 H. P. sizes; capacities from 800 to 7,200 gallons per hour.

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Ideal Engines are built for hard work and lots of it. There isn't an unnecessary detail in their make-up—just pure unadulterated power, delivered in a form that is easy to understand, operate and care for.

And because of their power and extra rugged construction, Ideal Engines are most often selected to tackle the jobs which have proven too difficult for ordinary engines.

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Devises real cost keeping systems to suit YOUR Business

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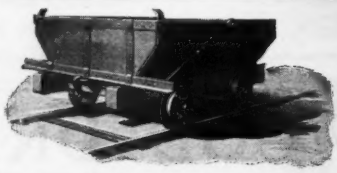
The same work for less money; more work for the same money



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**Rails, Switches, Etc.**
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**SAND AND GRAVEL PLANTS—DREDGES**
**HYDRAULIC EXCAVATING EQUIPMENT**
Hydraulic dredging equipment of my design now operating has annual capacity of over 25,000,000 cubic yards
Make use of the experience gained by 15 years' intensive study of problems of pumping solids before deciding upon the equipment for your new plant or the rehabilitation of your present plant

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**BOX CAR LOADER**

A new model for loading Sand, Gravel, Lime, Salt, Phosphates and other materials. This Loader "works like a wheel-barrow." It is easily handled and earns its cost rapidly, without injuring fragile materials. We make 7 types of Box-Car Loaders. This one is "Type P." Write for particulars. "It's a 'great' little machine."

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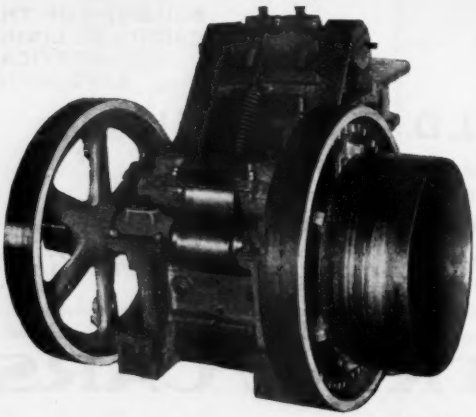

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**The Crusher with the Longer Life.**

All **RELIANCE** Equipment is built to meet the hardest conditions and to operate at an extremely low maintenance cost.

**We manufacture a complete line of**

## QUARRY AND ROAD-BUILDING EQUIPMENT

**WRITE US FOR CATALOGUE AND PRICES**

**Prompt Deliveries**

## Universal Road Machinery Co.

**Kingston, N. Y.**

**Canadian Representatives F. H. HOPKINS & CO., Montreal and Toronto**

**They produced Limestone at 10 to 15 Cents a Ton and**

***Then They Bought THREE MORE***

## American Ring Pulverizers

There is a demand for limestone and furnishing this product can prove an added source of profit in quarrying. Our pulverizer with its rolling ring action is highly efficient, and low in power consumption and in upkeep.

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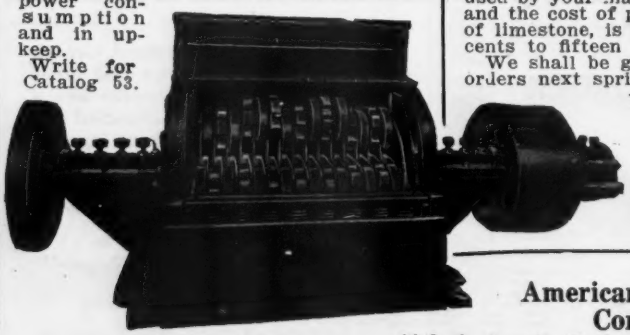

***Here's What They Say:***

Gentlemen:—

After investigating different pulverizer constructions, we were advised by good authorities to purchase one of the American Pulverizers, especially suited for grinding limestone. Up to now we have ground over ten thousand (10,000) tons of limestone in the last three (3) months, with your machine No. 36 and we can say that the amount of power used by your machine, is very low and the cost of production per ton of limestone, is running from ten cents to fifteen cents per ton.

We shall be glad to double our orders next spring.

Yours very truly,
COLUMBIA QUARRY COMPANY,
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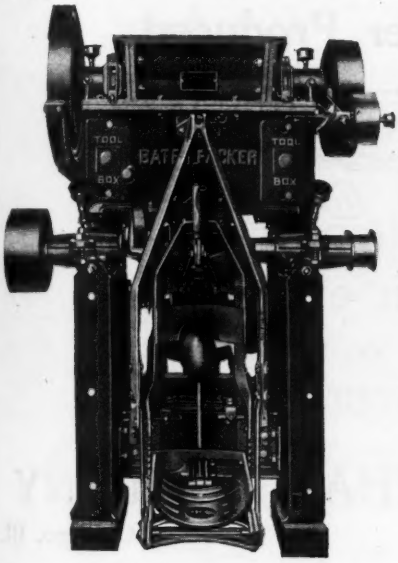
Secretary.
St. Louis, Mo.

**American Pulverizer Company**

**18th & Austin Sts., St. Louis, Mo.**

# BATES BAG FILLING MACHINE



*Less Labor*
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*Reduced Cost*

Used universally for packing pulverized rock products.

**Bates Valve Bag Company**
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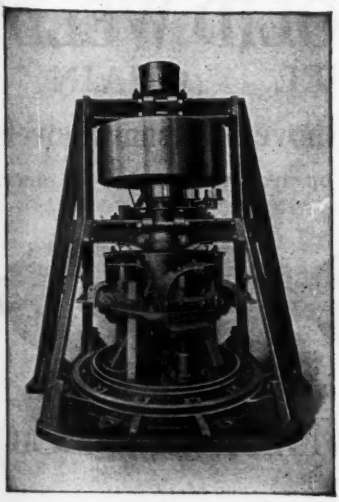

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Produces a very fine, uniformly-ground product at minimum cost. A mill built to meet the demands of the most exacting trade.

Produces a fine-ground product cheaper than most other machines when producing coarse materials.

*Finishes in Single Operation*

We are prepared to furnish complete plans for agricultural limestone plants.

Catalog 42 Upon Request

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BOSTON LONDON Works: ALLENTOWN, PA.

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TAYLOR
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Cuts down expenses,
Eliminates waste time,
Increases your yardage

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## "HERCULES SOLID WELD"

STEAM SHOVEL CHAIN

**The Chain That Puts the Shove in Steam Shovels**

In use for many years. Will not open at weld or go to pieces before it actually wears out.

*Manufactured only by:*

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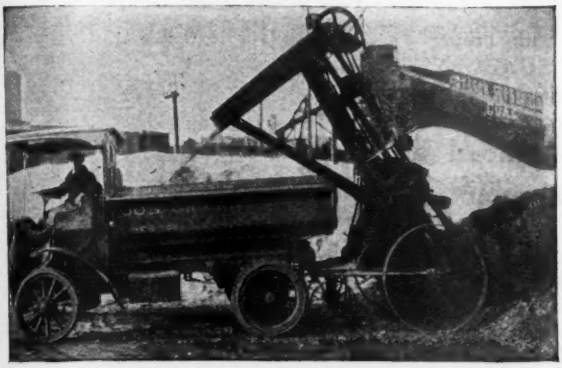
# Handling Crushed Stone, Gravel and Sand with G.-W. Loaders



THERE are a number of contributing reasons for the quick-loading ability of the G-W Wagon Loader.

**FIRST**—The frame is of light steel, though exceedingly strong and rigid, making it easy to move the machine about.

**SECONDLY**—The collapsible feature permits the machine to be lowered to clear obstructions such as are found in many yards. To raise or lower the machine, less than one minute is required.

**THIRDLY**—All mechanism is a model of simplicity, making for easy and rapid handling, and minimum upkeep.

By all means get our "Bulletin 40." It's full of data and pictures showing what G-W Wagon Loaders can do in the way of handling crushed rock, gravel, sand, etc.

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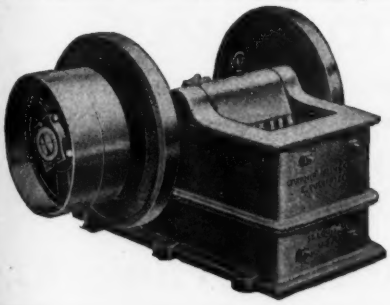
A powerful Pulverizer that grinds coal, reduces limestone, lime, clinkers, shale, gypsum, etc., and assists Tube Mill.

The Gruendler Sledge Hammer Pulverizer is more compact and has a greater grinding area and a larger capacity per horsepower than any other mill. Built to last a lifetime—economical to operate and maintain.



Let us help solve your problems. Catalog and prices furnished on request.

**Gruendler Patent Crusher and Pulverizer Co.**

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When equipped with proper size feeder, the SUNBURY Automatic Unloader

**Will load or unload a 50-ton car in 90 minutes!**

***The* SUNBURY Automatic Unloader**

And one man can handle it. The first cost is reasonable and its return from the standpoint of its being able to substantially increase your profits makes it a very profitable investment.

Its automatic feature is important and will commend it to you. It is simple in construction, strongly built and economical in operation.

*We will be pleased to send you an illustrated descriptive circular.*

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## SAVES 6 TO 12 MEN

**Storing and Reclaiming—Loading and Unloading All Kinds of Material**

**OVER 2,000 USERS**

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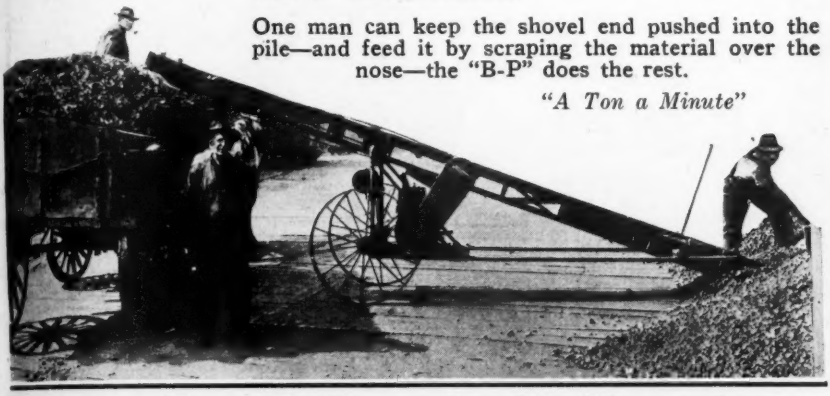
# Low Cost Loading

*Bulletin C-204 is yours for the asking—no obligation.*

Brown Portable Belt Conveyors cut your loading costs from one-half to three-quarters the cost of hand-methods.

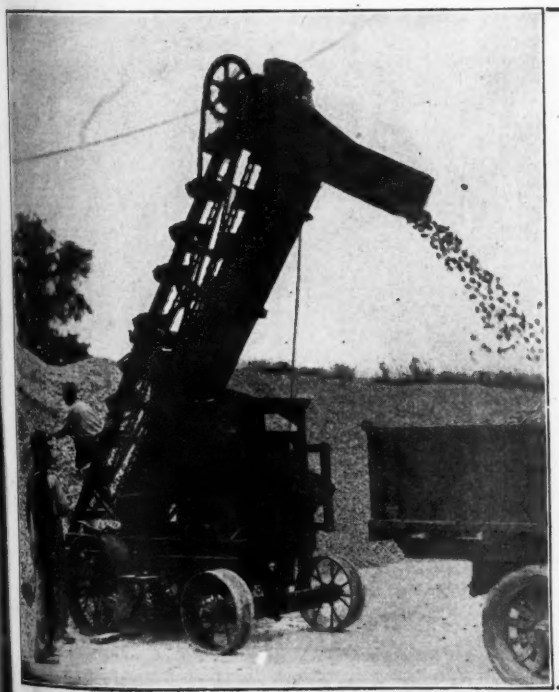
One man can keep the shovel end pushed into the pile—and feed it by scraping the material over the nose—the "B-P" does the rest.

*"A Ton a Minute"*



**Brown Portable Conveying Machinery Co.**

**10 S. La Salle St., Chicago. 30 Church St., New York City**



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## Self-Propelling
# LOADERS

Loading the Atlas Way, spells economy and efficiency in handling sand, crushed stone or gravel.

Let an Atlas Loader be one of the means to help solve your labor problems. Loaders built for handling coal and other loose material.

Write us what your wants are and let us tell you how you can handle your material cheaper and better. Write for

Atlas Loader Catalogue.

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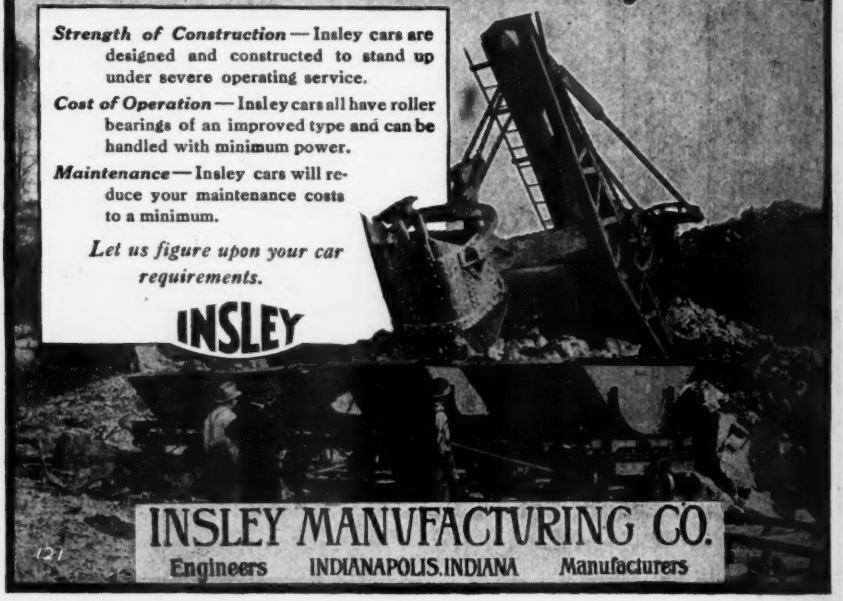
***Strength of Construction*** — Insley cars are designed and constructed to stand up under severe operating service.

***Cost of Operation*** — Insley cars all have roller bearings of an improved type and can be handled with minimum power.

***Maintenance*** — Insley cars will reduce your maintenance costs to a minimum.

*Let us figure upon your car requirements.*

INSLEY

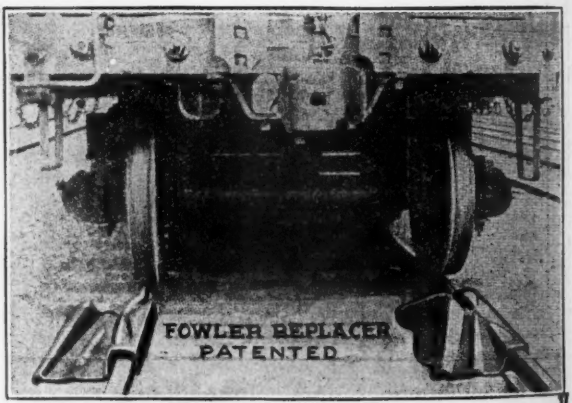


INSLEY MANUFACTURING CO.

Engineers INDIANAPOLIS, INDIANA Manufacturers

## They're Pretty Nearly Worth Their Weight in Gold—

when a derailment occurs and things are tied up.

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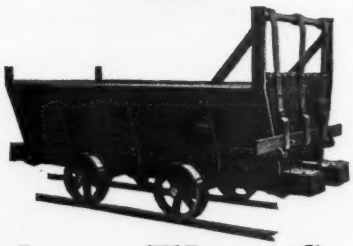
**Fabricated of flange pressed steel, reinforced**

Have tremendous sustaining power, yet are reasonably light in weight. Enable the replacing of a heavily loaded car or engine in a few minutes. Can be handled by one man. Their cost is trifling compared to their usefulness, even as insurance if nothing else. Built in two sizes.

*Write for detailed description and prices*

**Track Equipment Co., Huntington, W. Va.**

KOPPEL



# Built Right—They Stay Right

There's few hurry calls for parts with Koppel Cars.
They are made to give long service and they do.

*Catalogue on request*

**KOPPEL INDUSTRIAL CAR & EQUIPMENT CO.**
KOPPEL, PENNA.
SALES OFFICES:
CHICAGO, 808 Peoples Gas Bldg. NEW YORK, 30 Church St., Room 512
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PHILADELPHIA, 1420 Chestnut St.

# Gandy

the standard belt of the industrial world.

Look for the green edge and Gandy trade mark

Use Gandy, the original stitched cotton duck power and conveyor belt. Made in many widths and plies.

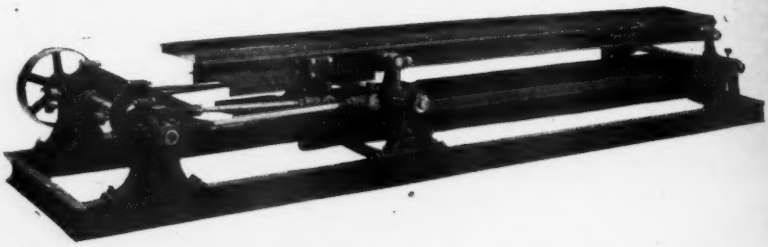
**THE GANDY BELTING CO.**
*Main Office and Factory*
750 West Pratt Street,
BALTIMORE, MD.
*Branches:*
36 Warren St. NEW YORK CITY
549 W. Washington St. CHICAGO, ILLINOIS

## THE BALANCED ACTION SHAKER SCREEN

THAT SHAKES

## WITHOUT VIBRATION

Works as quietly and as smoothly as a steam engine. No bumps, no jars, no grinding annoyance. Just a steady all-day, all-service machine built for one purpose—to separate mineral aggregates cheaply, thoroughly, with little power and less upkeep. Note that patented Rocker Arm? See how it makes the backward travel of one frame assist the forward travel of the other? It "cushions" the sudden stopping of one frame by the starting action of the other. Simple? Yes, and it does the work—quietly, quickly and efficiently. And it stands up under conditions that have scrapped many other types. A right design combined with proper construction securing the durability of structural steel, grey iron, bronze and babbitt. Write for catalog.



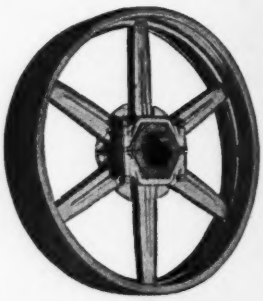
**COYLE & ROTH** MINNEAPOLIS MINNESOTA

THE BEST BELT

THE DICKBELT

FOR ALL PURPOSES

THE BEST PULLEY



BARRY STEEL SPLIT

*WRITE US FOR OUR NEW CATALOGUE*

## R. & J. DICK COMPANY, INC.

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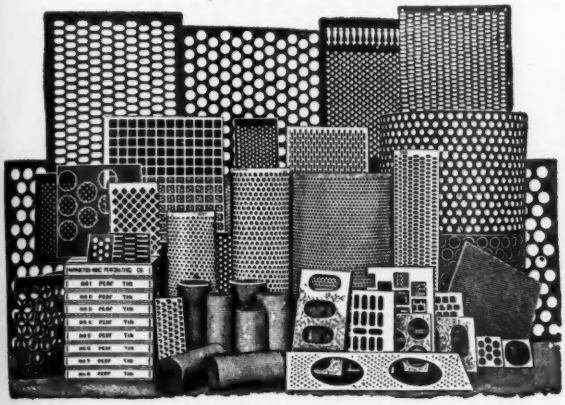
Branch Stores and Agencies in all Principal Cities of the World

## Perforated Steel Screens

**of Every Description**



For
STONE,
GRAVEL,
SAND,
CEMENT
And All
MINERALS

**The Harrington & King Perforating Co.**

638 N. Union Avenue
CHICAGO

114 Liberty Street
NEW YORK

# H. W. FALKER

*Designer and Builder of*

## Screening Plants

*For* Sand—Stone—Gravel

Plans and Specifications
Estimates

*Patentee of*
Economy Gyrating
Shaker Screen

ASHLAND, PA.

## *Built Especially for Stone Quarries*

No. S. Y. 12

# SUPERIOR STONE GRAPPLE

Has a grip that a seven-ton stone cannot loosen. Yet its powerful manganese steel calked fingers quickly pick up or release rocks weighing from a few hundred to fifteen thousand pounds, at the will of the operator.

Simple in design and has few parts, so that finger tips, joint pins and bushings can be replaced at small expense when necessary.

Type S. X. 5, having five forged fingers with tool steel points, is designed for handling rocks of 15 tons and upward, used in building breakwaters and similar work.

**Built by**

**Superior Iron Works Co.**

**Superior, Wis.**

# OSGOOD 18 ¾ yd. Traction Revolving Steam Shovel

is a splendid investment and one that has earned substantial profits for many companies operating Stone Quarries, Sand and Gravel Pits, etc. Its wide range of action and high dump make it especially popular.

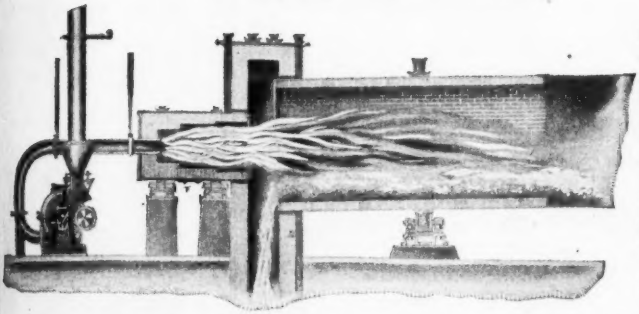
## THE OSGOOD COMPANY

MARION, OHIO

**Write today for copy of our new General Catalog D-2**

# PULVERIZED COAL

*for Drying and Calcining*



CEMENT
LIME
GYPSUM
MAGNESITE
DOLOMITE
BAUXITE
PHOSPHATE ROCK
ETC.

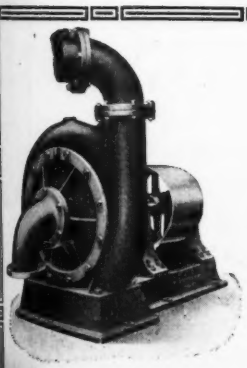
## THE AERO PULVERIZER

Burns coal like a gas, producing at will a wide range of temperature, a flame, the physical and chemical character of which is regulable—one that may be elongated or shortened, made oxidizing, reducing or neutral as occasion may require.

**Write for Literature**

## AERO PULVERIZER COMPANY

1441 Equitable Bldg., NEW YORK, N. Y.



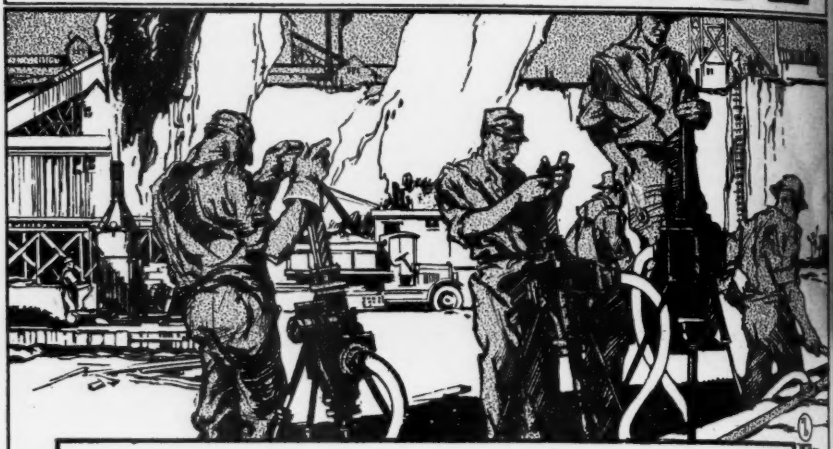
# Weight
# Life
# Efficiency

For 20 years the Kingsford Sand Pumps have been acknowledged the standard. Made in all sizes.

## KINGSFORD FOUNDRY AND MACHINE WORKS

Oswego, N. Y.

# 4810 AIR HOSE



4810 Air Hose has proven to be the most economical air hose manufactured. This fact is now recognized by operators of quarries, mines, machine shops, shipyards, structural steel builders and all classes of industry requiring the most efficient labor and machinery.

Its thick, tough cover more than withstands all the punishment to which air hose is subjected. It has the best oil-resisting tube yet developed. It is the most flexible and will remain flexible longer than any other pneumatic hose made.

4810 Air Hose is a *balanced* product.

## United States Rubber Company

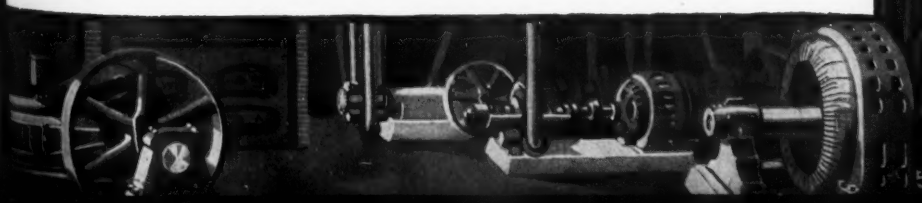
*The world's largest and most experienced manufacturer of mechanical rubber goods*

UNITED STATES RUBBER COMPANY AND ASSOCIATED COMPANIES — US RUBBER SYSTEM

*TO MANUFACTURERS of POWER PLANT EQUIPMENT and SUPPLIES:*

*The sand and gravel, stone, cement, gypsum and lime industries, composing the field served by PIT and QUARRY, employ an aggregate of about two million horse power, and offer a large and ready market for all kinds of power and transmission machinery and supplies.*

*PIT and QUARRY, by its 100% complete circulation in this field, makes these industries entirely accessible to you at one expense. Advertising rates and A. B. C. circulation data upon request.*



# Three Important Facts About The Buckeye Boiler Skimmer

## IT SAVES COAL

Enormous **savings of coal and labor** are effected. Boilers are kept clean and working steadily.

## IT OPERATES AUTOMATICALLY

**Buckeye Skimmers** float on the water level, collecting the scum of mud, grease and lime and removing them to an outside settling chamber. There they are separated from the water and the latter, still hot, **absolutely pure,** returned to the boiler.

## IT COSTS NOTHING TO MAINTAIN

Its first cost is last cost and it soon turns first cost into savings. **Buckeye Skimmers** are adapted for all types of boilers, and work automatically. Used with satisfaction on thousands of boilers.

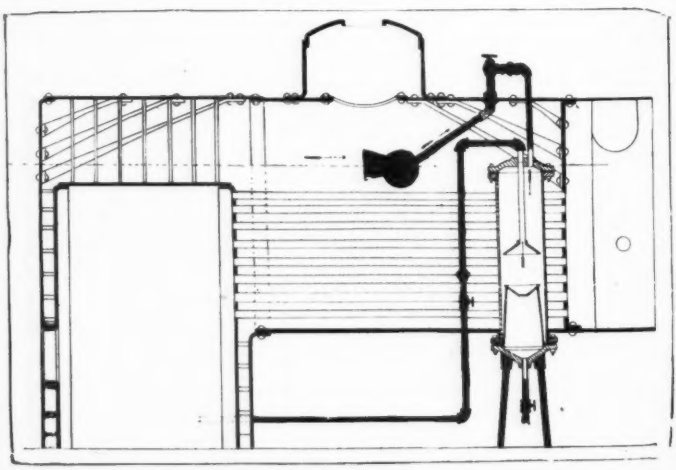
(Letter from J. F. Kern, Drainage Contractor, Butler, Mo.)

Dec. 5, 1919.

We would not think of operating a boiler where dirty water has to be used at times without your skimmer. It is an actual saving of time as well as its great convenience in the lessened care of the boiler. Washings are reduced, I think at least 300%.

Me for the Skimmer. My fireman seems to think firing is easier and less fuel used.

J. R. KERN.



**We'll send you one on 30 days' trial. Return at our expense if it is not satisfactory. Write for our catalogue.**

## THE BUCKEYE BOILER SKIMMER CO.

**Water Works Drive, TOLEDO, OHIO**

**Western Representative**
**CYRUS J. HOLLAND**
**730 Peoples Gas Bldg.**
**CHICAGO, ILL.**

**Eastern Representative**
**W. F. CREMEAN**
**316 Miners Bank Bldg.**
**WILKES-BARRE, PA.**

# Electricity in Quarry Operation

A paper before the Louisville Convention of the National Crushed Stone Association

BY WALTER D. MYERS

Sales Engineer, Louisville Gas & Electric Company, Louisville, Ky.

UNLIKE most lines of industry that can be and are established in convenient locations, accessible to all the advantages of labor, power, water and transportation facilities, stone quarries must, of necessity, be located where the deposits of stone are found, with the result that, with few exceptions, their locations are most inaccessible and remote from the advantages enjoyed by other lines of manufacture.

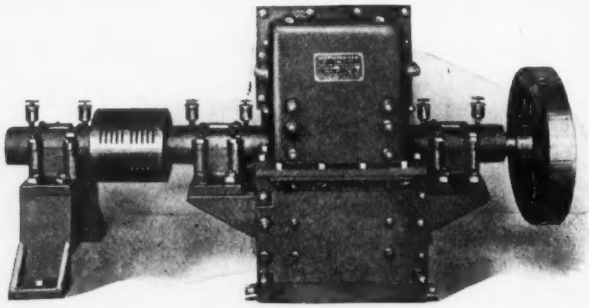
Due to this one reason more than any other, the application of electricity has not been so general as in other lines of industry. The distributing power companies, in many instances, refusing to consider large investments in transmission lines and other equipment, the development of electricity in this field has practically been left to the salesmen of electrical machinery, hence, the industry has been deprived, to a great extent, of the persistent efforts of the sales engineers of the service companies, who are the greatest developers of electricity in all of its uses. However, with this handicap, the substitution of electricity for steam power is increasing steadily in the stone quarries of the United States.

Electricity offers many advantages in works of this character. Almost every variety of stone-crushing machinery manufactured in this country is designed so that it can be driven by an electric motor. We have electric air channelers, electric hoists, electric locomotives, motor-driven air compressors, stone crushers, pulverizing mills, screens, pumps, electric-driven shovels or drag-lines; in fact, everything used in connection with the quarrying of the stone and making it marketable, can be driven with electricity.

We will deal only with alternating current, polyphase service, as that is fast becoming the standard service, not only furnished by the large power companies, but recommended by all consulting engineers for plants of 50 kw., or more.

There are two general types of induction motors which fulfill the requirements of rock-crushing plants, i. e., the slip-ring and the squirrel-cage types. The former, when furnished with drum-type, non-reversible controllers and resistance, is suitable for service requiring frequent starting under load, or the starting of loads with high inertia. The squirrel-cage type motor, equipped with compensator, is extremely simple and able to stand hard service. The absence of a commutator enables it to operate satisfactorily in locations where dust and dirt would prevent the employment of slip-ring motors, but its construction does not enable this type of motor to be started with very high torque, consequently it is not adapted to certain loads, as for ball mills, tube mills, etc.

It must be recognized that it is impossible to establish definite ratings for motors to drive certain machinery, as the conditions under which machinery is operated will vary in different plants from ten to one hundred per cent, causing a wide variation in power required. For general information, however, the following table is used, as a rule, for recommending the size



# If you haven't heard what the

# K-B PULVERIZER

**is doing for others in cutting down running expenses by using less power, let us send you figures on what you want to crush.**

**Built entirely of steel, the "K-B" will pulverize the hardest kind of shale and toughest of clays with ease**

***Write Us for Proof***

K-B PULVERIZER

**K.-B. PULVERIZER CO., Inc.**

**92 Lafayette Street, New York**

of motors for the different machines used in connection with rock-crushing plants:

**Gyratory Crusher**

| | H. P. Required |
|---|---|
| No. 1 | 6 |
| No. 2 | 10 |
| No. 3 | 15 |
| No. 4 | 20 |
| No. 5 | 26 |
| No. 6 | 40 |
| No. 7½ | 17 |
| No. 8 | 100 |
| No. 9 | 140 |
| No. 10 | 175 |
| No. 12 | 200 |
| No. 18 | 250 |
| No. 24 | 300 |

**Blake Crusher**

| | H. P. Required |
|---|---|
| 4x10-in. | 4 |
| 7x10-in. | 7 |
| 9x15-in. | 12 |
| 10x20-in. | 20 |
| 15x24-in. | 25 |

**Dodge Crusher**

| | H. P. Required |
|---|---|
| 4x6-in. | 4 |
| 7x9-in. | 8 |
| 8x12-in. | 12 |
| 10x16-in. | 18 |

**Universal Crusher**

| | H. P. Required |
|---|---|
| No. 1 | 2-3 |
| No. 1-M | 3-4 |
| No. 2 | 5-8 |
| No. 2-M | 7-10 |
| No. 3 | 7-10 |
| No. 3-M | 12-15 |
| No. 4 | 15-20 |
| No. 4-M | 20-25 |
| No. 5 | 25-30 |
| No. 5-M | 30-35 |

**Symons Disk Crusher**

| | H. P. Required |
|---|---|
| 24-in. | 18-25 |
| 36-in. | 30-40 |
| 48-in. | 50-65 |

**Brainard Pulverizers**

| | H. P. Required |
|---|---|
| No. 0 | 8-12 |
| No. 1 | 12-16 |
| No. 2 | 20-25 |
| No. 3 | 40-50 |

**Griffin Mill**

| | H. P. Required |
|---|---|
| 42-in. | 50-60 |

**Fuller Mill**

| | H. P. Required |
|---|---|
| 24-in. | 10 |
| 33-in. | 35 |
| 42-in. | 50 |
| 57-in. | 100 |

Prior to 1914 the cost of operating a power plant in most lines of industry did not receive very much consideration, but since that time, coal, labor, machinery and other items entering into the power plant costs have increased by leaps and bounds until it has grown to be a very important item in the yearly operating expenses; hence, the owners or stockholders, through their management, have begun to look upon the power plant with some consideration and are investigating the adisability of substituting other forms of power, and, naturally, turn to the consulting engineers or large power companies for advice.

The electricity required in the operation of rock-crushing plants varies from .34 kw.-hr. per ton of rock crushed to 3.3 kw.-hr. per ton of rock crushed. The wide variation in energy is due to a great extent to the character of the rock, and the quantity of air required in drilling, and the method of drive, i. e., individual or group.

As an illustration, I have made up a comparison between the cost of operating a typical stone-crushing plant with purchased power and operating the same plant from an individual steam plant:

Plant crushing limestone for ballast,
Employing 35 to 40 men,
Operating 10 hours per day,
Capacity, 600 to 700 tons per day,
Connected load in motors, 345 h. p.
Individual drive.
Plant operated from March 1 to December 1.
Plant idle from December 1 to March 1.
Average monthly consumption during months plans is in operaton, 14,000 kw.-hr.
Electric energy, 3c per kw-hr.
Monthly minimum required, $172.50.
Cost to operate plant with purchased power:

| | |
|---|---|
| Electricity, 126,000 kw.-hr. per year at 3c per kw.-hr. | $3,780.00 |
| Minimum, 3 months plant is idle | 517.50 |
| Yearly operating cost | $4,297.50 |

**Yearly Operating Cost with Steam Power**

| | |
|---|---|
| 756 tons coal at $4.00 per ton | $3,020.00 |
| Labor, fireman, $3.50 per day | 945.00 |
| Oil, waste, boiler compound and miscellaneous | 150.00 |
| Interest, 6%; depreciation, 7%; taxes, insurance and upkeep, 3%; or a total of 16% on $10,000 investment in boilers and building for power plant | 1,600.00 |
| Yearly operating cost | $5,715.00 |

For handling sand, gravel, and other solids in suspension at a minimum cost, use

## Erie Sand-Gravel Dredging Pumps

Small sizes as well as largest ones are designed to give maximum output and greatest wear for a given weight.

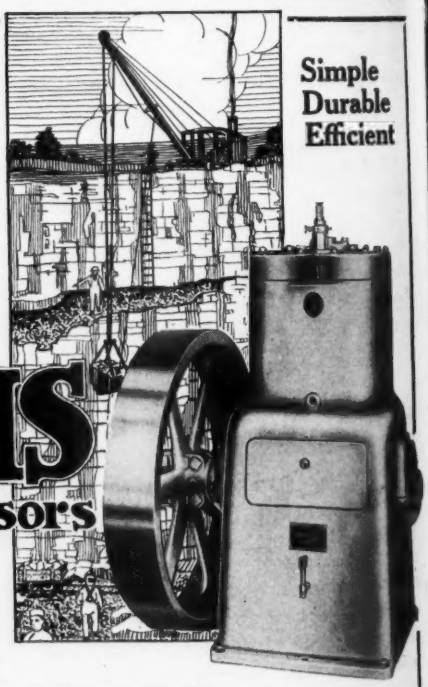
***Tell us your conditions, giving total vertical lift with length or pipe line, and ask for Bulletin P-33***

**ERIE PUMP AND ENGINE WORKS**

Formerly of ERIE, PA. MEDINA, N. Y.

## OPERATE WITH LESS POWER

Curtis Air Compressors require less power to operate, because of correct design, good materials used, conscientious construction, and the embodiment of our long experience in manufacturing machinery of this character.



**Simple Durable Efficient**

# CURTIS Air Compressors

Are especially adapted to Pit and Quarry uses. Have self-regulating splash system for cylinder oiling. Can be furnished with automatic unloader if desired. 80% more cooling surface than any double-acting compressors of same capacity. Fully enclosed—dirt and dust proof. Write for illustrated bulletin describing our various models.

**CURTIS PNEUMATIC MACHINERY CO.**

1828 Kienlen Ave., St. Louis, Mo. Branch Office: 531-K Hudson Terminal, New York City.

In my assumption I have used the maximum prevailing rates usually quoted for service in such quantities. I have not included the cost of steam engines for the reason that the cost of motors for the electric-driven plant will just about offset the cost of engine units. I have not included the cost of an engineer in the steam-operated plant for the reason that the claim will be made (though not always true) that an electrician will be required in the electric-driven plant.

Aside from the actual saving of over $1,400.00, or 25 per cent per annum, as shown in operating cost, you will find that electricity has many advantages. It can be applied at the point where the power is needed; it can be so distributed that no part of the plant is dependent on the other for operation. The throwing of a switch by an unskilled laborer will start the plant in operation. The money invested in a power plant can be invested in producing machinery and earn many times the 6 per cent allowed for interest charge.

---

The Hartford Sand & Stone Company, Hartford, Conn., has made William J. Thornton, formerly connected with the Connecticut High Way Commission vice-president. James H. Cooke, former vice-president, is now president of the concern.

---

The Rhodes Construction Company, of Franklin, Tenn., has purchased the large crushing plant of the W. J. Sparks Construction Company, of Lewisburg, Tenn. They will at once install new and larger machinery for the manufacture on a large scale of various kinds of crushed stone. Agricultural lime for fertilizing purposes will be one of the main products. This will be one of the largest plants of its kind in the South.

# Very Much Exaggerated

## Price on Sand in Louisville Not So Bad After All

SOMEONE tried a few days ago to tell that sand prices in Louisville, Ky., had gone up 100 per cent. Thereupon the Louisville Times made an investigation and discovered the conditions to be this way:

Close scrutinizing of the new prices for washed river sand and gravel announced by the Ohio River Sand Company, show that the advances do not amount to 100 per cent, as had been reported, but that the increase ranges from 7 to 17.3 per cent on sand according to the location of the delivery, and from 6.3 to 15.8 per cent increase on washed river gravel, the average increase for sand being 11.6 per cent and for gravel 10.2 per cent.

The comparison of the new prices is made with the price list issued in June, 1918, which was not thereafter changed that year or during 1919.

John M. Settle, secretary and treasurer, explained that one of the large items of expense in the sand and gravel business is that of delivery, and that the city has been divided into eight districts. The company increased its 1920 prices, but also increased its trade discount from 2 per cent in 1918 to 8 per cent in 1920.

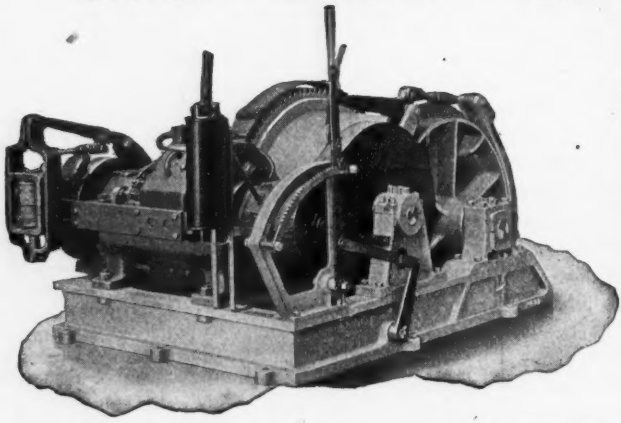
Mr. Settle said:

"The 1920 prices of this company less the trade discount, show an increase ranging from 17.3 per cent in the nearest district, to 7 per cent in the most distant district, or an average increase of 11.6 per cent for washed river sand. The 1920 prices less the trade discount, show an increase of 15.8 per cent in the nearest district, and 6.3 per cent in the most distant district, or an average of 10.2 per cent for washed river gravel. These comparisons are made with the price list issued in June, 1918, which was not thereafter changed in that year, nor was any increase whatever made during the year 1919.

"Taking the eight districts over the whole city, our 1920 prices show an average increase over 1918 or 10.9 per cent in both materials and not 100 per cent as was reported."

# LIDGERWOOD HOISTS

**Steam — Electric — Gasolene**



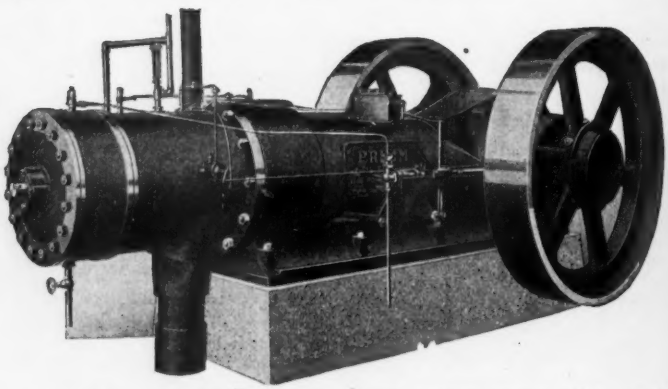
Tell us what you wish in the hoist line. We build types to meet every need in hoisting service. Send for Catalogs.

Our Engineers will consult with you at any time.

**Lidgerwood Mfg. Co.**

96 Liberty Street New York

## "PRIMM" OIL ENGINES



The new "PRIMM" Oil Engine will deliver power with a saving of up to 80%.

Investigate the merits of this engine.

There is reason for the great expansion of our business in the last twelve years.

This engine starts and operates on fuel oil, the cheapest fuel obtainable.

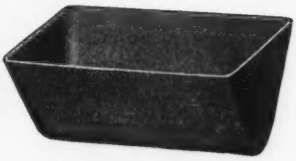
**A SIZE AND TYPE FOR EVERY NEED ILLUSTRATED IN OUR CATALOG**

**THE POWER MFG. CO.** 913 Cheney Ave. **MARION, OHIO.**

**Howe Double-Locked Combination Chain** is a development of old type combination Malleable Iron and Steel Chains, which for years have been constructed with pins or rivets flattened at one end only to lock them to the side links.

The outstanding feature is the double-locked pin, machined flat at both ends, driven tight into machined holes in the side links, actually integral with the side links. These pins cannot work loose and wear in the side links. All wear takes place over large area between pin and barrel of center link—elongation is minimized. High Carbon Steel pins and side links, with Charcoal Malleable Iron center links, further guarantee non-stop performance under heavy service.

**Howe Charcoal Malleable Iron Elevator Buckets**—Highest quality castings, uniform throughout, with clean, straight edges. All buckets reinforced at corners to add to strength and durability. Large stocks of standard styles and sizes always available.



*Write for Catalog* 100.

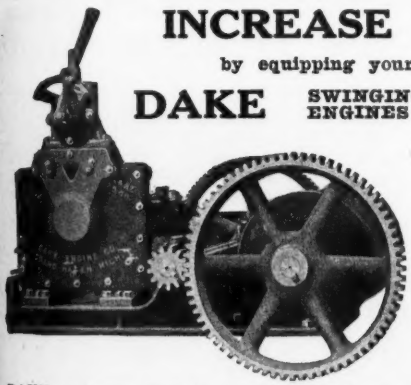
**Howe Chain Company, Muskegon, Michigan**

# Howe Chains-Buckets

## INCREASE PRODUCTION

**by equipping your bull-wheel derricks with**

**DAKE** **SWINGING ENGINES**

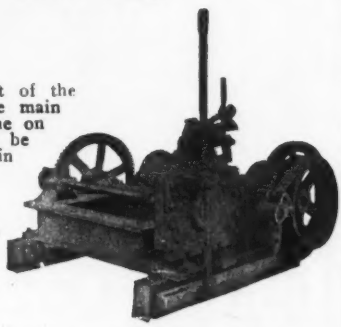


For every DAKE Swinger you install, you have a faster, more efficient derrick, which saves you time and labor.

**Engines have no dead centers, but start, stop, and reverse instantly.**

DAKE swingers may be bolted directly in front of the hoisting engine, with plenty of clearance for the main hoisting lines. They are furnished with the engine on either right or left hand side, so that they may be installed on either side of the hoist, and be within direct and immediate control of the engineer.

Send for catalog and full particulars.



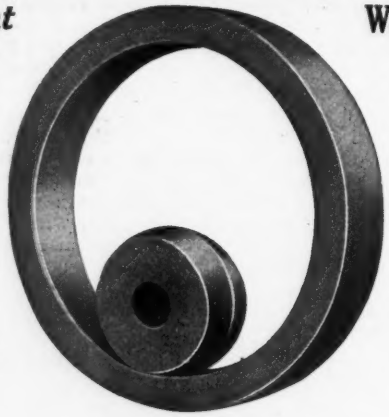
**Dake Engine Co., Grand Haven, Mich.**

New York: H. L. Drullard, 30 Church St.

Chicago: J. E. Chisholm & Co., Ltd.
741 Monadnock Block

## Grind It *Right* With *Adamite*

This cut shows an ADAMITE Mill tire weighing 6521 lbs. and a roll of 265 lbs. used with most satisfactory results for making Portland Cement.



ADAMITE is also used for rolls of all kinds — gears — pinions — crusher jaws, etc., and anywhere that durability and wear resisting qualities are desirable.

**ADAMITE**

**EMBODIES THE EXCELLENCIES OF STEEL AND IRON WHILE AVOIDING THE WEAKNESSES OF BOTH**
**Replacement costs will be greatly reduced by its use.**

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**Executive Offices, Pittsburgh, Pa.** **Foundries, Midland, Pa.**

## *Specially Built for Severe Outdoor Service*

Type B-A McCord Force Feed Lubricators are so designed and constructed that the most severe usage and abrupt temperature changes of outdoor service do not affect its adjustment—they continue, under the most trying conditions, to deliver just the right amount of oil, in just the right place, at just the right time.

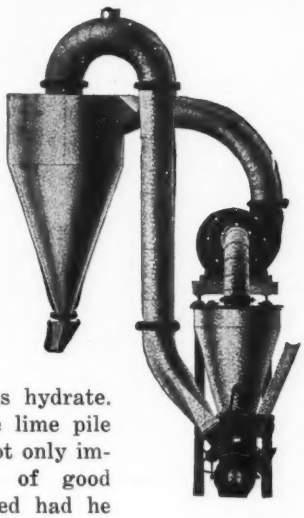
This weatherproof quality is an all-important difference of "McCord's"—of inestimable value to operators of Shovels, Locomotives, Dredges, Pumps, Etc.

There is, however, a McCord for every need and a need for every McCord. In your Power Plant, perhaps, with Engine or Compressor, you may be having lubrication troubles. McCords will correct them. Write for information.

**McCord Mfg. Co., Inc., Detroit, Mich., U. S. A.**

**TYPE B-A McCord FORCE FEED Lubricators**

**A remark made by one of our customers manufacturing Hydrated Lime emphasizes more clearly than anything we can say, the economy in using Raymond Air-Separating equipment instead of screens.**



"Our neighbor uses screens for his hydrate. Outside his plant there is a waste lime pile of many hundred tons containing not only impurities but a high percentage of good Hydrate which he could have saved had he the same equipment as ours."

The Raymond Air-Separating System performs three distinct operations and gives a finished product which does not blister in wall plaster.

The Hydrate is fed to the System by an automatic feed arrangement, which feeds a constant amount, and prevents flooding.

The beaters in the grinding chamber of the mill are operated at a low speed to merely knock the good Hydrate free of the impurities like core, sand and unburnt lime. These impurities being discharged through an automatic throw-out attachment.

The good Hydrate is carried up into the air-separator, where large particles which are not fine enough are returned for further reduction and the finished uniform material is carried direct to a storage bin, from which it is bagged.

An investigation will bear out all these statements and show you where a great saving can be obtained.

# Raymond Bros. Impact Pulverizer Co.

**1307 Branch St. Chicago, Ill.**

Combination Body raised by Hydro Hoist

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**The Watchwords of Heil's Steel Dump Bodies and Hydro Hoists**

They outlast other equipment because they are built to a standard and not to a price. No outfit can leave the factory until it has been thoroughly tested and inspected.

The bodies are strongly built, rivets are closely centered, the reinforcing is adequate and the workmanship is uniformly excellent.

Best of all, Hydro equipment will give good service during the life of the truck. One of the distinctive features of the Hydro Hoist making this possible is the elimination of pulleys, cables, pipes, rollers and arms. Notice the simplicity of the hoist. Circular 110 shows dump bodies for Pit and Quarry work.

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